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CONDITION SURVEY AND PAVER IMPLEMENTATION, EDWARDS AIR FORCE BASE (SOUTH BASE), CALIFORNIA

by

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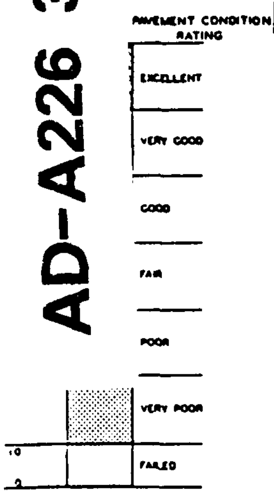

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A pavement condition survey was performed on the South Base airfield at Edwards Air Force Base, CA, in August 1989 for the purpose of determining the pavement condition index of the airfield features and for performing the initial implementation of the PAVER pavement management system. The pavement identification and condition survey data were input into a Micro PAVER data base.

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(South Base)
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PREFACE

The condition survey described in this report was requested by Military Interdepartmental Purchases Request (MIPR) No. F04611-89-X-0091 dated 17 February 1989 from AFFTC/PKOS, Edwards Air Force Base, CA, to the US Army Engineer Waterways Experiment Station (WES), Vicksburg, MS.

The condition survey of the South Base airfield at Edwards Air Force Base was performed by a WES condition survey team from 27 July to 3 August 1989. The team consisted of Messrs. R. A. Bentsen, W. P. Grogan, D. D. Mathews, and R. T. Graham, Pavement Systems Division (PSD), Geotechnical Laboratory (GL). This report was prepared by Mr. Bentsen under the supervision of Messrs. J. W. Hall, Jr., Chief, Systems Analysis Branch, PSD, and H. H. Ulery, Jr., Chief, PSD. The work was under the general supervision of Dr. W. F. Marcuson III, Chief, GL, WES. Ms. Odell F. Allen, Visual Production Center, Information Technology Laboratory, edited the report.

Commander and Director of WES during the preparation of this report was COL Larry B. Fulton, EN. Technical Director was Dr. Robert W. Whalin.

CONTENTS

CONVERSION FACTORS, NON-SI TO SI (METRIC) UNITS OF MEASUREMENT

Non-SI units of measurement used in this report can be converted to SI (metric) units as follows:

Multiply	By	To Obtain
feet	0.3048	metres
inches	2.54	centimetres
pounds (force) per square inch	6.894757	kilopascals
square feet	0.09290304	square metres

CONDITION SURVEY AND PAVER IMPLEMENTATION, EDWARDS AIR FORCE BASE (SOUTH BASE), CALIFORNIA

PART I: INTRODUCTION

Background

1. This report describes the condition survey and initial implementation of a pavement management system utilizing the PAVER system of the South Base airfield pavements at Edwards Air Force Base (AFB), CA. The implementation was performed to provide base engineers with the initial data base required for making pavement management decisions concerning costs and maintenance requirements. The condition survey was performed by the US Army Engineer Waterways Experiment Station (WES) from 27 July to 3 August 1989.

Objective and Scope

2. The overall objective of this project was to determine the pavement condition of the South Base airfield pavements at Edwards AFB and to input the information into a Micro PAVER data base to provide the base engineers with a permanent data base to use for future pavement management decisions. This objective was accomplished by:

- a. Performing a condition survey of the pavements in accordance with AFR 93-5 (Headquarters, Department of the Air Force 1981).
- b. Inputting the pavement network and condition survey information into Micro PAVER to calculate a pavement condition index (PCI) of each of the pavement features.
- c. Producing detail drawings of the pavement features to ensure that future condition surveys will be performed at the same locations as the one performed for this report.

PART II: PAVEMENT CONDITION SURVEY

Introduction

3. A pavement condition survey is performed to determine the present surface condition of the various pavement features on an airfield. The procedure used in performing the condition survey was developed by the US Army Corps of Engineers and has been accepted as a regulation by the US Air Force (Headquarters, Department of the Air Force 1981). The knowledge of the condition survey procedures discussed in AFR 93-5 is required for the use and understanding of this report.

Pavement Definition and Identification

4. The pavement network is divided into three specific units in order to manage the pavement network effectively. The three units of division are the feature, the section, and the sample unit. The method for dividing the pavement network is detailed in AFR 93-5 and is briefly discussed herein.

5. Airfield pavement features, or branches in some terminology, are defined by various parameters as the pavement type, construction history, and pavement usage. The feature designations of South Base were most recently established in "Airfield Pavement Evaluation, Edwards Air Force Base (South Base), California" (US Air Force Engineering and Services Center 1983). The features in that report include a general aviation runway which had been designated on the main apron. This runway has since been deactivated. The airfield is currently only used by aero club traffic and other small aircraft; therefore, the feature designations for this report were determined by investigating the construction history and making the appropriate feature designations based on the pavement usage (runway, taxiway, or apron). These feature designations are shown in Figure 1. Two older evaluation reports, "Airfield Pavement Evaluation, Muroc Army Airfield, Muroc, California" and "Airfield Pavement Evaluation, Addendum No. 2, Muroc Army Airfield, Muroc, California" (US Engineer Office, Los Angeles, California 1944, 1947), were extensively used in determining the original construction of the South Base. The physical property data for the features, given in Table 1, are a compilation of the data in all three evaluation reports. Locating the features on the airfield

itself is necessary before the performance of the condition survey can proceed.

6. After each pavement feature had been defined, further division of the feature may be required for reasons such as traffic flow. The further division of features is done into sections. For instance, a runway feature may be 150 ft* wide, but the majority of the traffic occurs in the middle of the feature. Therefore, a section is defined in the center of the feature with additional sections defined on either side of the middle section. Also, an apron may contain taxi lanes which the aircraft follow to their parking locations, a section which would differ from the areas used for the actual parking of the aircraft. Therefore, these elements of the feature are divided into sections. If a feature requires no division, for definition purposes it is still considered to contain one section.

7. After the pavement section definition has been completed, the section is divided into sample units, which are conveniently sized areas of pavement on which the inspection is performed. A standard sample unit on asphaltic concrete (AC) pavement is a 5,000-sq ft area, and a standard sample unit on portland cement concrete (PCC) pavement consists of 20 slabs. A pavement section is divided into sample units for condition survey purposes only. Recognizing that not all sample units can fit into the general requirement of 5,000 sq ft or 20 slabs, deviations of 25 percent on either side of these values are allowed for survey purposes.

8. When a section has been divided into sample units, it has been properly prepared for the survey. An inspection of all of the sample units within a section could require a considerable amount of time. Therefore, the random sampling method was developed to provide an adequate calculation of the PCI while inspecting only a portion of the sample units in a section. The method, further defined in AFR 93-5, allows for a reduction in the number of sample units surveyed without a significant loss of accuracy in the calculation of the PCI. It should be noted, however, that the inspection of all the sample units may be necessary for estimation of maintenance and repair work.

9. An essential concept in pavement management is determining the deterioration of the pavement surface over time. The PCI is used in the PAVER

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* A table of factors for converting non-SI units of measurement to SI (metric) units is presented on page 3.

system to determine this deterioration. Determining the PCI of a pavement section at different time intervals requires that the same sample units of the section be surveyed to get a precise idea of the deterioration rate. Drawings of each of the pavement features and any section divisions have been included in this report to illustrate the sample units within each feature to permit future condition surveys to be conducted at these same locations. Figures 2 to 15 illustrate the sample unit layouts for each of the features and sections at South Base. The circled numbers indicate the sample units that were surveyed. In features where no numbers are circled, the number shown indicate the sample units that were surveyed.

10. The PCC construction joints in features R1A, R7A, T4A, T8C, and T9C were not saw cut but formed with a fiberboard insert which initiated a crack and created the joint as the PCC cured. The slab layouts in the respective figures were those used in the design, and the slabs represented in the figures exist in the actual pavement. However, joint alignment was not strictly maintained during construction, and there are some minor deviations from the design joint layout.

Pavement Inspection

11. The performance of a condition survey consists of inspecting the pavement surface for various types of distresses, determining the severity of each distress found and measuring the amount of distress within the sample unit. Distress quantities on AC pavement are measured in either linear feet or square feet within the sample unit, and those on PCC pavement are measured by counting the number of slabs affected within the sample unit.

12. The product of the condition survey is the PCI of the sample unit. The PCI is a value from 0 to 100 (worst to best, respectively) of the surface condition of the pavement. The PCI is obtained by determining a deduct value for the amount of each distress type and the severity found in the inspection, determining a corrected deduct value for the combined effect of various distresses on the pavement condition, and subtracting the corrected deduct value from 100. A pavement with no distress has a PCI of 100. Varying amounts of distress decrease the PCI value to a possible low of 0. Pavement condition ratings (excellent to failed) are assigned to different levels of PCI values. These ratings and their respective PCI value definitions are shown in

Figure 16. The PCI of the pavement section is calculated by averaging the PCI's of the sample units surveyed.

13. The majority of the pavement features at South Base are rated from fair to very good condition with some features rated from poor to excellent. Figure 17 illustrates the condition ratings of the features at South Base. Features T1C, T2C, and T3C were not due to the construction of an ordinance road down the taxiway length. Section 2 of feature A3B is inside the B-2 test facility and was not surveyed due to its proximity to the security fence. Photos 1 through 14 show various distresses that were observed on the airfield pavements.

PART III: MICRO PAVER DATA BASE IMPLEMENTATION

14. The use of the PAVER pavement management system requires knowledge of both computers and the PAVER system itself. Micro PAVER is a microcomputer-based version of the PAVER pavement management system. When discussing the pavement management system itself, the terms PAVER and Micro PAVER are interchangeable. Discussions concerning the Micro PAVER data base and the operations involved with the Micro PAVER programs are specific to Micro PAVER. This report does not describe the operation of a computer; it does outline the necessary Micro PAVER procedures in moderate detail. The "Micro PAVER User's Guide" (US Army Engineer Construction Engineering Research Laboratory 1988) goes into specific details of all the procedures for setting up and using a Micro PAVER and should be used as a reference when performing operations in the Micro PAVER system.

15. The Micro PAVER system consists of three different system functions. Performing each function requires the use of specific programs, files, and procedures. The three functions are data entry, report generation, and data analysis.

Data Entry

16. The pavement network data are entered into the Micro PAVER data base in a logical order that defines the features and sections first. The condition survey data and additional information are then entered which allows the user to perform data base related operations such as PCI calculation and report generation. Data are entered into the Micro PAVER data base through a series of menu-driven Micro PAVER programs.

17. The two ways to collect the condition survey data in the field are by recording the data manually on condition survey data sheets and later placing the data into the Micro PAVER data base, or by inputting the data directly into the FIELD program on a portable computer. The FIELD program places the data into the necessary Micro PAVER format as the data are entered into the computer and saves the data in a file that can be directly transferred to the Micro PAVER data base. The data for the South Base condition survey were collected on data sheets and later input into Micro PAVER.

Report Generation and Data Analysis

18. Micro PAVER generates reports that provide a summary or specific information utilizing the data stored in the data base. It also calculates information such as budget needs from data and analysis programs provided with the Micro PAVER system. These reports can be used to generate broad information of the entire data base or to list details from a selected portion of the pavement system. Brief descriptions of the Micro PAVER reports are given in Table 2. The data report and analysis programs provide an engineer with the information required to make pavement management decisions.

19. The results of two Micro PAVER reports have been included in this report. The Inspection Report produces a detailed summary of the distresses found in each sample unit surveyed as well as an extrapolation for the entire section. Table 3 gives the summary of the extrapolated distresses for each feature and section. The current condition of the South Base pavements is basically the result of a lack of maintenance. The absence of joint sealant has allowed the joints to become contaminated with incompressibles and blow-ups, and high-severity joint spalling have resulted. If the South Base is to be an active military airfield, an extensive maintenance program will be needed to restore much of the pavement to a useful condition.

20. The Inspection Schedule Report gives the section surveying requirements for the next 5 years, depending on the minimum PCI and rate of deterioration deemed allowable for each section use and rank. The results of the Inspection Schedule Report are presented in Table 4. The minimum PCI and deterioration rates input to the Inspection Schedule Report were a minimum PCI of 70 for all features and allowable time limits between inspections of 1 year for rates of deterioration above 6 points per year, 3 years for rates of deterioration between 2 and 6 points per year, and 5 years for rates of deterioration below 2 points per year. Generally, the results in Table 4 are indicative of the current feature condition. The features requiring inspection in 1990 have a PCI of less than 70, and the features requiring inspection from 1991 to 1995 have a PCI of greater than 70. The decision to follow this inspection schedule essentially depends on whether the South Base is to be used as an active airfield. If the airfield is going to remain inactive, an ongoing condition survey program would be of little benefit.

REFERENCES

Headquarters, Department of the Air Force. 1981. "Airfield Pavement Evaluation Program," Air Force Regulation AFR 93-5, Washington, DC.

US Air Force Engineering and Services Center. 1983 (May). "Airfield Pavement Evaluation, South Field, Edwards Air Force Base, California," Tyndall AFB, FL.

US Engineer Office, Los Angeles, California. 1944 (May). "Airfield Pavement Evaluation, Muroc Army Airfield, Muroc, California," Los Angeles, CA.

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US Army Corps of Engineers Construction Engineering Research Laboratory. 1988 (Sep). "Micro PAVER User's Guide," Version 2.0.

Table 1

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE				SUBBASE			SUBGRADE		
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION, PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	CBR %	K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR %	K PSI/IN
R1A	Runway 6-24	400	300	Very Good				11	PCC	675	18	Granular Fill		250				Silty Sand (SM)		100
R2A	Runway 6-24	600	50	Very Good				13	PCC	675								Silty Sand (SM)		
R3C	Runway 6-24	600	200	Fair				5	AC		6	Soil Cement						Silty Sand (SM)		
R4C	Runway 6-24	600	50	Excel-lent				9	PCC	850								Silty Sand (SM)		
R5C	Runway 6-24	6,500	50	Very Good				13	PCC	675	6	Gravel						Silty Sand (SM)		100
R6C	Runway 6-24	6,500	250	Very Good				6	PCC	850	6	Gravel						Silty Sand (SM)		100
R7A	Runway 6-24	500	300	Very Good				9	PCC	850	12	Granular Fill						Silty Sand (SM)		120
O1C	Runway 6-24 Overrun	1,100	120	Good				2	AC		6	Sandy Gravel (GP-GM)	45		28	Silty Sand (SM)	35	Clay (CL)	6	
T1C	West End Taxiway	1,300	Varies					11	PCC	675	18	Granular Fill						Silty Sand (SM)		100

(Continued)

(Sheet 1 of 3)

Table 1 (Continued)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE				SUBBASE			SUBGRADE		
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX. STR. (PSI)	THICKNESS (IN)	DESCRIPTION	CBR %	K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR %	K PSI/IN
T2C	West End Taxiway	Varies	Varies					7	AC		6	Sandy Gravel (GP)	35					Silty Sand (SM)	10	
T3C	West End Taxiway	150	Varies					11	PCC	675	18	Granular Fill						Silty Sand (SM)		100
T4A	West End Ladder Taxiway	950	Varies	Very Good				9	PCC	750	12	Granular Fill		250				Silty Sand (SM)		100
T5C	Interior Ladder Taxiway	600	100	Good				6	PCC	850	6	Gravel						Silty Sand (SM)		100
T6C	Interior Ladder Taxiway	600	100	Poor				6	PCC	850	6	Gravel						Silty Sand (SM)		100
T7C	East End Ladder Taxiway	800	100	Poor				6	PCC	750	6	Gravel						Silty Sand (SM)		100
T8C	East End Taxiway	345	150	Very Good				9	PCC	750	12	Granular Fill		250				Clay (CL)		100
T9C	East End Taxiway	1,650	Varies	Very Good				9	PCC	800	12	Granular Fill		250				Clay (CL) and Silty Sand (SM)		100
T10A	Main Apron Taxiway	4,600	100	Poor/ Good				9	PCC	750	6	Gravel						Silty Sand (SM)		100

WES FORM 1 JAN 83 1000

(Continued)

Table I (Concluded)

SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY					OVERLAY PAVEMENT			PAVEMENT			BASE				SUBBASE			SUBGRADE		
FEATURE	IDENTIFICATION	LENGTH (FT)	WIDTH (FT)	GENERAL CONDITION PCI	THICKNESS (IN)	DESCRIPTION	FLEX STR. (PSI)	THICKNESS (IN)	DESCRIPTION	FLEX STR (PSI)	THICKNESS (IN)	DESCRIPTION	CBR %	K PSI/IN	THICKNESS (IN)	DESCRIPTION	CBR %	DESCRIPTION	CBR %	K PSI/IN
T11C	East End Ladder Taxiway	Varies	Varies	Failed				6	PCC		6	Gravel						Silty Sand (SM)		100
A1B	North Apron Extension	Varies	Varies	Good				9	PCC	750	6	Gravel						Silty Sand (SM)		100
A2B	Main Apron	4,500	320	Fair				6	PCC	850	6	Gravel						Silty Sand (SM)		100
A3B	Main Apron Extension	660	Varies	Good				9	PCC	750								Silty Sand (SM)		100
A4B	West Apron Extension	Varies	Varies	Good/ Very Good				9	PCC	775	6	Gravel						Silty Sand (SM)		100
A5B	North Apron Extension	225	75	Very Poor				6	PCC	750	6	Gravel						Silty Sand (SM)		100
A6B	B-2 Test Facility	Varies	Varies	Very Good				17	PCC									Silty Sand (SM)		

WES FORM 1000 1 JAN 83

(Sheet 3 of 3)

Table 2

Micro PAVER Reports

List	-	Lists the branch name, number, and number of sections in each branch.
Inventory	-	Provides inventory information of the pavement sections.
PCI	-	Provides branch and section information, last construction, and inspection dates, age, and PCI for each branch/section combination.
Inspection	-	Provides both the summary and sample unit PCI and distress information for the pavement sections.
PCI Frequency	-	Provides an overall condition frequency, based on PCI, for the year requested.
Budget Planning	-	Provides a 5-year budget by estimating the costs to maintain the pavements above a given condition level.
Budget Condition Forecasts	-	A combination of the PCI frequency and budget planning reports; this predicts the budget and pavement condition depending on the repairs performed.
Inspection Schedule	-	Provides a schedule of sections to be inspected during a 5-year period.
Condition History	-	Provides a PCI versus time curve of a specific section, including a 5-year projection.
Family Curve	-	Models and predicts pavement condition of sections of a specific type, use, and rank (a family).
Section Prediction	-	Uses a family curve to predict the condition of selected sections.
M & R	-	Determines repair and overlay costs depending on the user's maintenance and repair policy.
Network Maintenance	-	Determines the repair costs over the entire network depending on the user's maintenance and repair policy.
Economic Analysis	-	Provides the user with annual cost information to help determine the most economical M & R alternative.
Pavement Performance Prediction	-	Nondata base PCI prediction models for AC or PCC pavements.

Table 3

Extrapolated Distress Summary - South Base

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
R01A	1	Corner break	L	1	0.27
		Linear cracking	L	8	1.37
		Linear cracking	M	1	0.27
		Jt* seal damage	H	648	100.00
		Shrinkage crack	N/A	30	4.67
		Joint spall	L	151	23.35
		Joint spall	M	10	1.65
		Corner spall	L	74	11.54
		Corner spall	M	7	1.10
R02A	1	Linear cracking	L	1	2.08
		Jt seal damage	M	48	100.00
		Small patch	L	1	2.08
		Shrinkage crack	N/A	19	39.58
		Joint spall	L	3	6.25
		Joint spall	M	1	2.08
		Corner spall	M	1	2.08
R03C	1	Block cracking	M	120,000**	100.00
		Weathering	L	120,000**	100.00
		Shoving	H	200**	0.17
R04C	1	Jt seal damage	H	160	100.00
		Shrinkage crack	N/A	6	4.29
		Joint spall	L	2	1.43
		Corner spall	L	1	0.71
R05C	1	Linear cracking	L	46	8.86
		Linear cracking	M	1	0.32
		Jt seal damage	M	520	100.00
		Shrinkage crack	N/A	18	3.48
		Joint spall	L	130	25.00
		Corner spall	L	3	0.63
R06C	1	Corner break	L	192	4.42
		Corner break	M	25	0.58
		Linear cracking	L	777	17.88
		Linear cracking	M	8	0.19
		Jt seal damage	M	4,350	100.00

(Continued)

* Jt = joint.
** Extrapolated quantity = square feet.

(Sheet 1 of 8)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
R06C (cont'd)	1	Small patch	L	41	0.96
		Large patch	L	217	5.00
		Large patch	M	58	1.35
		Shattered slab	L	217	5.00
		Shattered slab	M	8	0.19
		Shrinkage crack	N/A	108	2.50
		Joint spall	L	92	2.12
		Joint spall	M	8	0.19
		Corner spall	L	125	2.88
		Corner spall	M	50	1.15
		Corner spall	H	8	0.19
	2	Corner break	L	88	2.04
		Corner break	M	24	.56
		Linear cracking	L	402	9.26
		Linear cracking	M	88	2.04
		Jt seal damage	M	4,350	100.00
		Small patch	L	136	3.15
		Small patch	M	8	.19
		Large patch	L	40	.93
		Large patch	M	8	.19
		Faulting	L	354	8.15
		Shattered slab	L	40	.93
		Shrinkage crack	N/A	410	9.44
		Joint spall	L	64	1.48
		Joint spall	M	40	.93
		Joint spall	H	16	.37
		Corner spall	L	145	3.33
		Corner spall	M	96	2.22
		Corner spall	H	56	1.30
R07A	1	Linear cracking	L	2	1.52
		Jt seal damage	H	132	100.00
		Small patch	L	1	0.76
		Small patch	M	2	1.52
		Large patch	L	1	0.76
		Shrinkage crack	N/A	1	0.76
		Joint spall	L	25	18.94
		Joint spall	H	1	0.76
		Corner spall	L	15	11.36
		Corner spall	M	1	0.76
		Corner break	L	18	2.87
		Linear cracking	L	7	1.15
		Jt seal damage	H	660	100.00

(Continued)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
R07A (cont'd)	2	Small patch	L	5	0.86
		Small patch	M	1	0.29
		Shrinkage crack	N/A	37	5.75
		Joint spall	L	110	16.67
		Joint spall	M	20	3.16
T04A	1	Corner break	L	4	0.70
		Linear cracking	L	11	1.40
		Jt seal damage	H	940	12.00
		Large patch	L	6	0.70
		Joint spall	L	205	6.40
		Joint spall	M	39	3.90
		Joint spall	H	6	3.00
		Corner spall	L	53	2.10
		Corner spall	M	16	1.20
		Corner spall	H	2	1.20
T05C	1	Corner break	L	16	5.00
		Linear cracking	L	30	9.09
		Jt seal damage	H	332	100.00
		Large patch	M	7	2.27
		Shattered slab	L	15	4.55
		Shattered slab	M	9	2.73
		Shrinkage crack	N/A	3	0.91
		Joint spall	L	21	6.36
		Joint spall	M	1	0.45
		Corner spall	L	46	14.09
		Corner spall	M	6	1.82
T06C	1	Corner break	L	54	16.36
		Corner break	M	3	0.91
		Linear cracking	L	60	18.18
		Linear cracking	M	6	1.82
		Jt seal damage	H	332	100.00
		Faulting	M	1	0.45
		Shattered slab	L	107	32.27
		Shattered slab	M	52	15.91
		Shrinkage crack	N/A	1	0.45
		Joint spall	L	3	0.91
		Corner spall	L	3	0.91
T07C	1	Corner break	L	40	9.41
		Corner break	M	21	5.10
		Corner break	H	5	1.18

(Continued)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
T07C (cont'd)	1	Linear cracking	L	66	15.69
		Linear cracking	M	15	3.53
		Linear cracking	H	5	1.18
		Jt seal damage	H	427	100.00
		Small patch	M	1	0.39
		Large patch	H	1	0.39
		Shattered slab	L	51	12.16
		Shattered slab	M	63	14.90
		Shattered slab	H	15	3.53
		Shrinkage crack	N/A	31	7.45
		Joint spall	L	5	1.18
		Joint spall	M	3	0.78
		Joint spall	H	5	1.18
		Corner spall	L	11	2.75
		Corner spall	M	10	2.35
		Corner spall	H	11	2.75
T08C	1	Corner break	L	4	1.63
		Corner break	M	1	0.54
		Linear cracking	L	10	3.80
		Jt seal damage	H	276	100.00
		Shrinkage crack	N/A	19	7.07
		Joint spall	L	10	3.80
		Joint spall	M	28	10.33
		Joint spall	H	7	2.72
		Corner spall	L	1	0.54
		Corner spall	M	3	1.09
		Corner spall	H	4	1.63
T09C	1	Corner break	L	9	1.40
		Linear cracking	L	15	2.25
		Jt seal damage	H	679	100.00
		Small patch	L	1	0.28
		Faulting	L	3	0.56
		Shrinkage crack	N/A	11	1.69
		Joint spall	L	238	35.11
		Joint spall	M	38	5.62
		Corner spall	L	72	10.67
		Corner spall	M	40	5.90
T10A	1	Blowup	L	26	2.86
		Blowup	M	15	1.67
		Corner break	M	2	0.24
		Linear cracking	L	6	0.71

(Continued)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
T10A (cont'd)	1	Jt seal damage	H	939	100.00
		Small patch	L	44	4.76
		Large patch	L	8	0.95
		Large patch	M	2	0.24
		Shattered slab	L	2	0.24
		Shrinkage crack	N/A	11	1.19
		Joint spall	L	93	10.00
		Joint spall	M	29	3.10
		Joint spall	H	13	1.43
		Corner spall	L	89	9.52
		Corner spall	M	20	2.14
		Corner spall	H	2	0.24
	2	Blowup	L	16	2.18
		Blowup	M	12	1.63
		Corner break	L	16	2.18
		Corner break	M	8	1.09
		Linear cracking	L	20	2.72
		Linear cracking	M	6	0.82
		Jt seal damage	H	744	100.00
		Small patch	M	2	0.27
		Large patch	L	12	1.63
		Shattered slab	H	2	0.27
		Shrinkage crack	N/A	26	3.54
		Joint spall	L	107	14.44
		Joint spall	M	125	16.89
		Joint spall	H	131	17.71
		Corner spall	L	117	15.80
		Corner spall	M	70	9.54
		Corner spall	H	109	14.71
	3	Blowup	L	8	1.12
		Corner break	L	17	2.24
		Linear cracking	L	93	12.04
		Jt seal damage	H	773	100.00
		Large patch	L	8	1.12
		Large patch	M	4	0.56
		Shrinkage crack	N/A	6	0.84
		Joint spall	L	142	18.49
		Joint spall	M	38	5.04
		Joint spall	H	6	0.84
		Corner spall	L	140	18.21
		Corner spall	M	51	6.72
		Corner spall	H	6	0.84

(Continued)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
T11C	1	Blowup	L	2	1.20
		Corner break	L	63	28.31
		Corner break	M	6	3.01
		Linear cracking	L	27	12.05
		Linear cracking	M	14	6.63
		Jt seal damage	H	225	100.00
		Large patch	L	4	1.81
		Shattered slab	L	20	9.04
		Shattered slab	M	35	15.66
		Shattered slab	H	6	3.01
		Shrinkage crack	N/A	32	14.46
		Joint spall	L	9	4.22
		Joint spall	M	20	9.04
		Joint spall	H	47	21.08
		Corner spall	L	14	6.63
		Corner spall	M	6	3.01
		Corner spall	H	59	26.51
A01B	1	Blowup	L	82	1.58
		Blowup	M	57	1.11
		Corner break	L	57	1.11
		Linear cracking	L	65	1.27
		Linear cracking	M	8	0.16
		Jt seal damage	H	5,179	100.00
		Large patch	L	73	1.43
		Shrinkage crack	N/A	196	3.80
		Joint spall	L	2,683	51.82
		Joint spall	M	287	5.55
		Joint spall	H	32	0.63
		Corner spall	L	878	16.96
		Corner spall	M	155	3.01
		Corner spall	H	24	0.48
A02B	1	Linear cracking	L	1,194	15.32
		Linear cracking	M	103	1.33
		Linear cracking	H	11	0.15
		Jt seal damage	H	7,800	100.00
		Small patch	L	333	4.27
		Small patch	M	114	1.47
		Small patch	H	80	1.03
		Large patch	L	103	1.33
		Large patch	M	22	0.29
		Faulting	L	45	0.59
		Shattered slab	L	1,160	14.87
		Shattered slab	M	321	4.12

(Continued)

Table 3 (Continued)

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
A02B (cont'd)	1	Shattered slab	H	11	0.15
		Shrinkage crack	N/A	1,045	13.40
		Joint spall	L	68	0.88
		Joint spall	M	68	0.88
		Joint spall	H	45	0.59
		Corner spall	L	91	1.18
		Corner spall	M	126	1.62
		Corner spall	H	241	3.09
A03B	1	Jt seal damage	H	96	100.00
		Small patch	L	8	8.33
		Shrinkage crack	N/A	17	18.06
		Joint spall	L	17	18.06
		Joint spall	M	9	9.72
		Joint spall	H	4	4.17
		Corner spall	L	6	6.94
		Corner spall	M	1	1.39
		Corner spall	H	1	1.39
A04B	1	Blowup	L	10	4.62
		Corner break	L	5	2.31
		Corner break	M	1	0.58
		Corner break	H	1	0.58
		Linear cracking	L	5	2.31
		Jt seal damage	H	218	100.00
		Small patch	L	13	6.36
	2	Blowup	L	3	0.60
		Blowup	M	3	0.60
		Corner break	L	3	0.60
		Corner break	H	1	0.30
		Linear cracking	L	3	0.60
		Small patch	L	80	12.95
		Small patch	M	3	0.60
		Small patch	H	1	0.30
		Large patch	L	24	3.92
		Large patch	M	1	0.30
		Shrinkage crack	N/A	54	8.73
		Joint spall	L	31	5.12
		Joint spall	M	5	0.90
		Joint spall	H	18	3.01
		Corner spall	L	16	2.71
		Corner spall	M	3	0.60
		Corner spall	H	3	0.60

(Continued)

Table 3 (Concluded)

Feature	Section	Distress	Severity	Extrapolated Quantity Number of Slabs	Percent of Total Area
A05B	1	Blowup	M	1	1.85
		Corner break	L	18	18.52
		Corner break	M	10	11.11
		Corner break	H	1	1.85
		Linear cracking	L	19	20.37
		Jt seal damage	H	98	100.00
		Shattered slab	L	16	16.67
		Shattered slab	M	10	11.11
		Shattered slab	H	1	1.85
		Shrinkage crack	N/A	9	9.26
		Joint spall	L	19	20.37
		Joint spall	M	3	3.70
		Joint spall	H	5	5.56
		Corner spall	L	10	11.11
		Corner spall	M	7	7.41
		Corner spall	H	3	3.70
A06B	1	Jt seal damage	H	649	100.00
		Small patch	L	27	4.24
		Shrinkage crack	N/A	82	12.73
		Joint spall	L	55	8.48
		Joint spall	M	5	0.91
		Corner spall	L	15	2.42
001C	1	L & T† cracking	L	4,037††	2.60
		L & T cracking	M	8,961††	5.77
		Rutting	L	32	0.02
		Rutting	M	320	0.21
		Shoving	L	513	0.33

† L & T - longitudinal and transverse.

†† Extrapolated quality - square feet.

‡ Extrapolated quality - linear feet.

(Sheet 8 of 8)

Table 4

A 5-Year Inspection Schedule, South Base

Year to Inspect	Feature	Sections
1990	R03C	1
	001C	1
	T05C	1
	T06C	1
	T07C	1
	10A	1, 2, 3
	T11C	1
	A01B	1
	A02B	1
	A03B	1, 2
	A04B	1
	A05B	1
1991	R06C	1, 2
	A06B	1
1993	T08C	1
	T09C	1
1995	R01A	1
	R02A	1
	R04C	1
	R05C	1
	R07A	1, 2
	T04A	1
	A04B	1

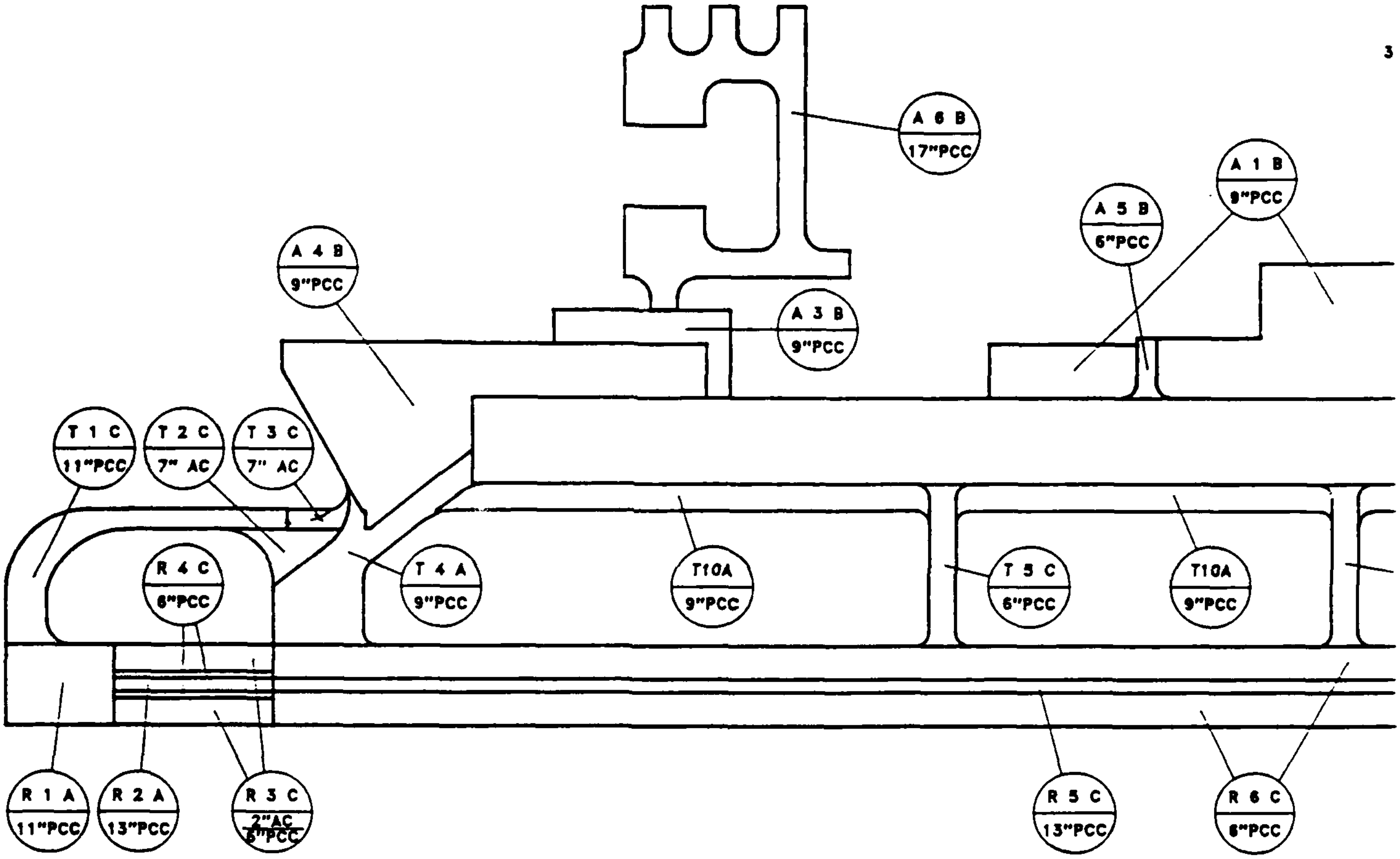
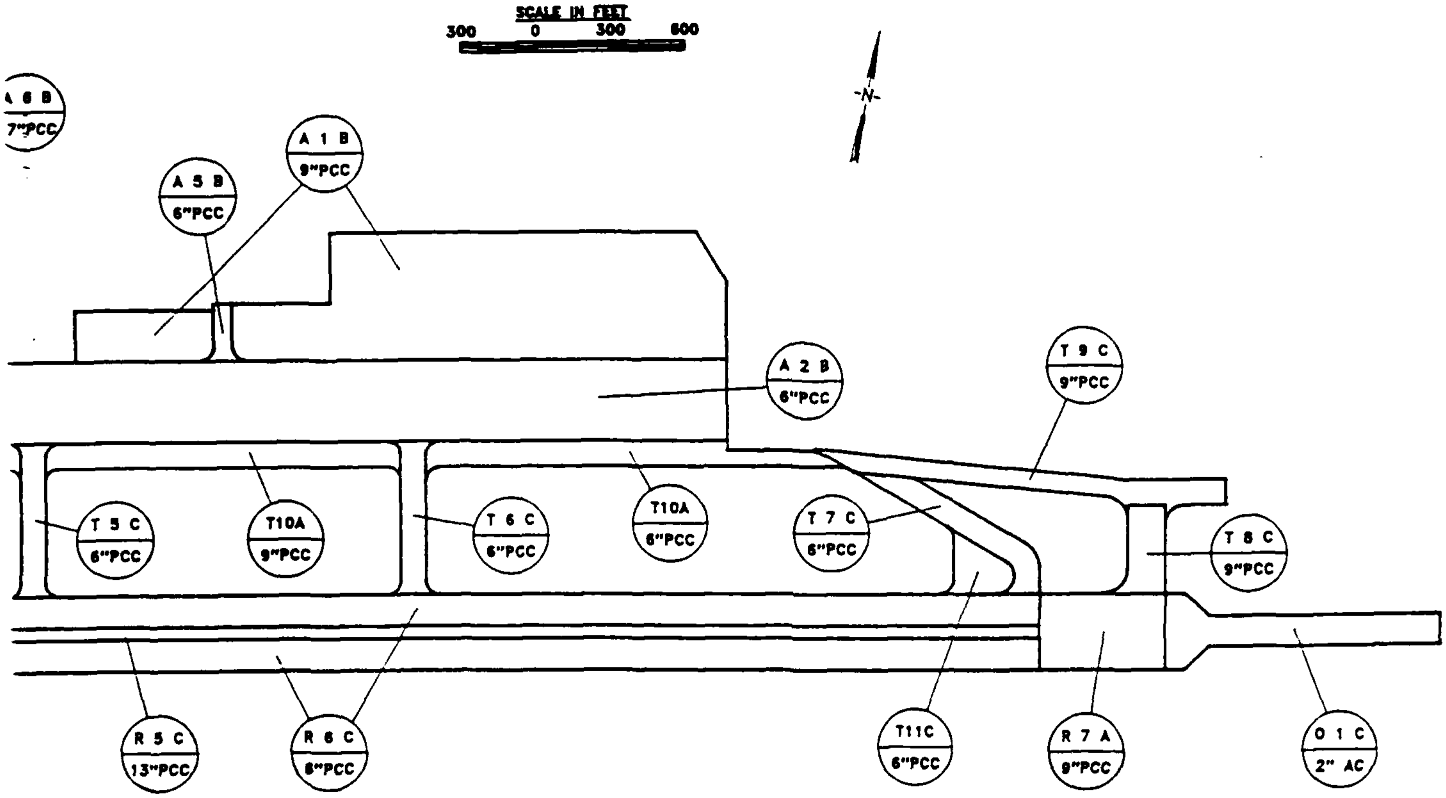


Figure 1. Airfield pavement feature identif.

1of2



Airfield pavement feature identifications of South Base

2of2

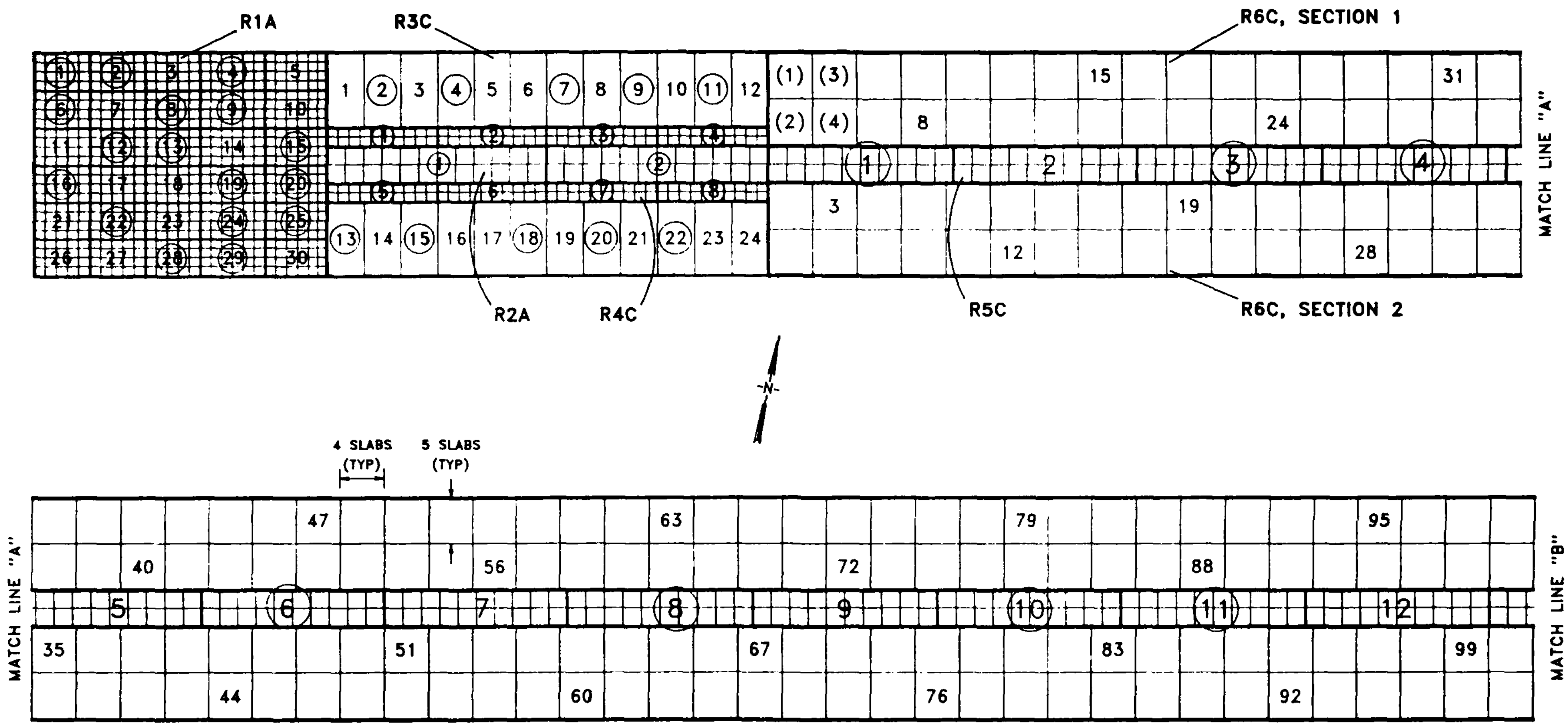


Figure 2. Sample unit layout, Runway 6-24 (features R1A, R2A, R3C, R5C, and R6C)

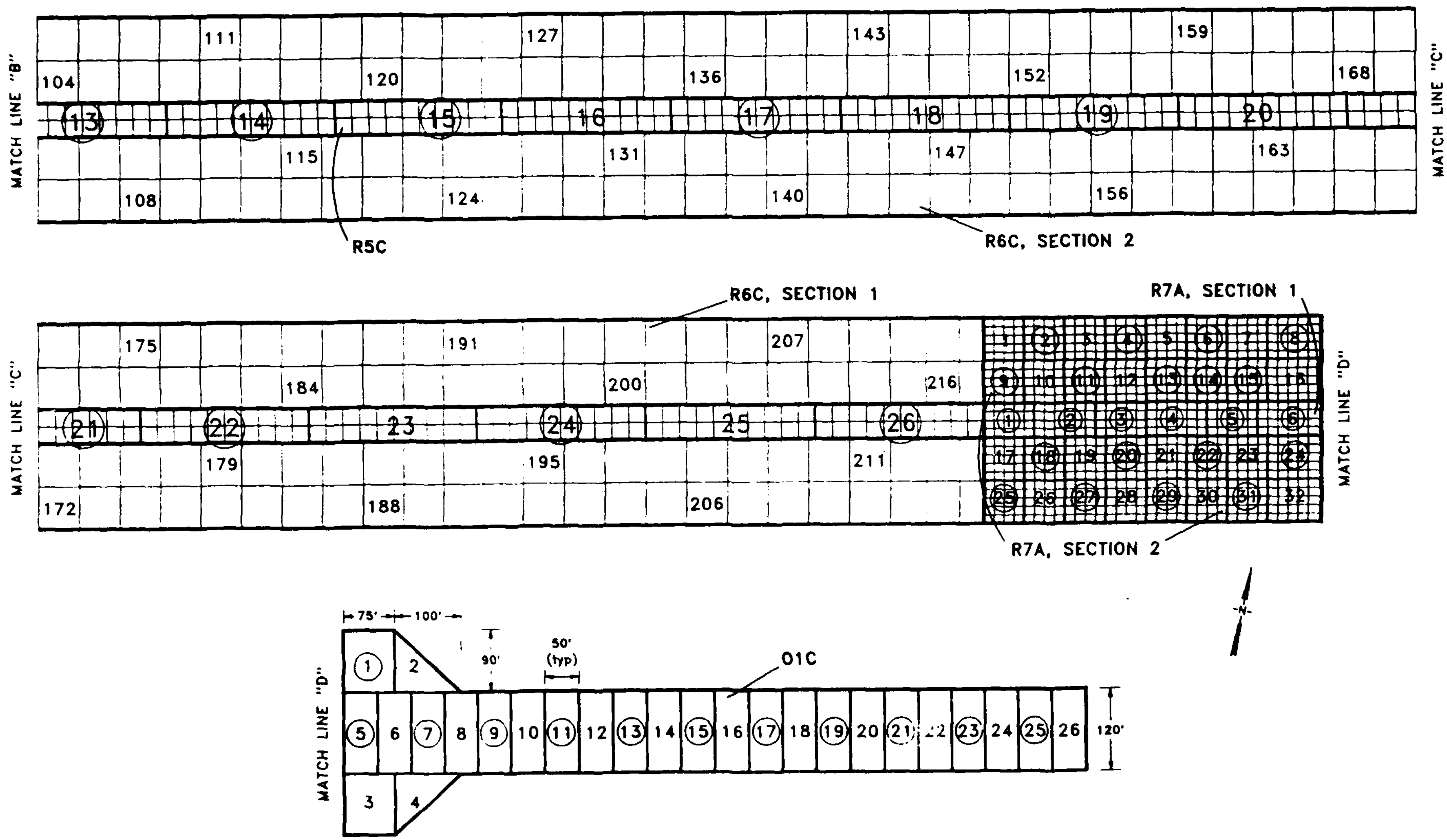


Figure 3. Sample unit layout, Runway 6-24 (features R5C, R6C, and R7A) and the overrun (feature O1C)

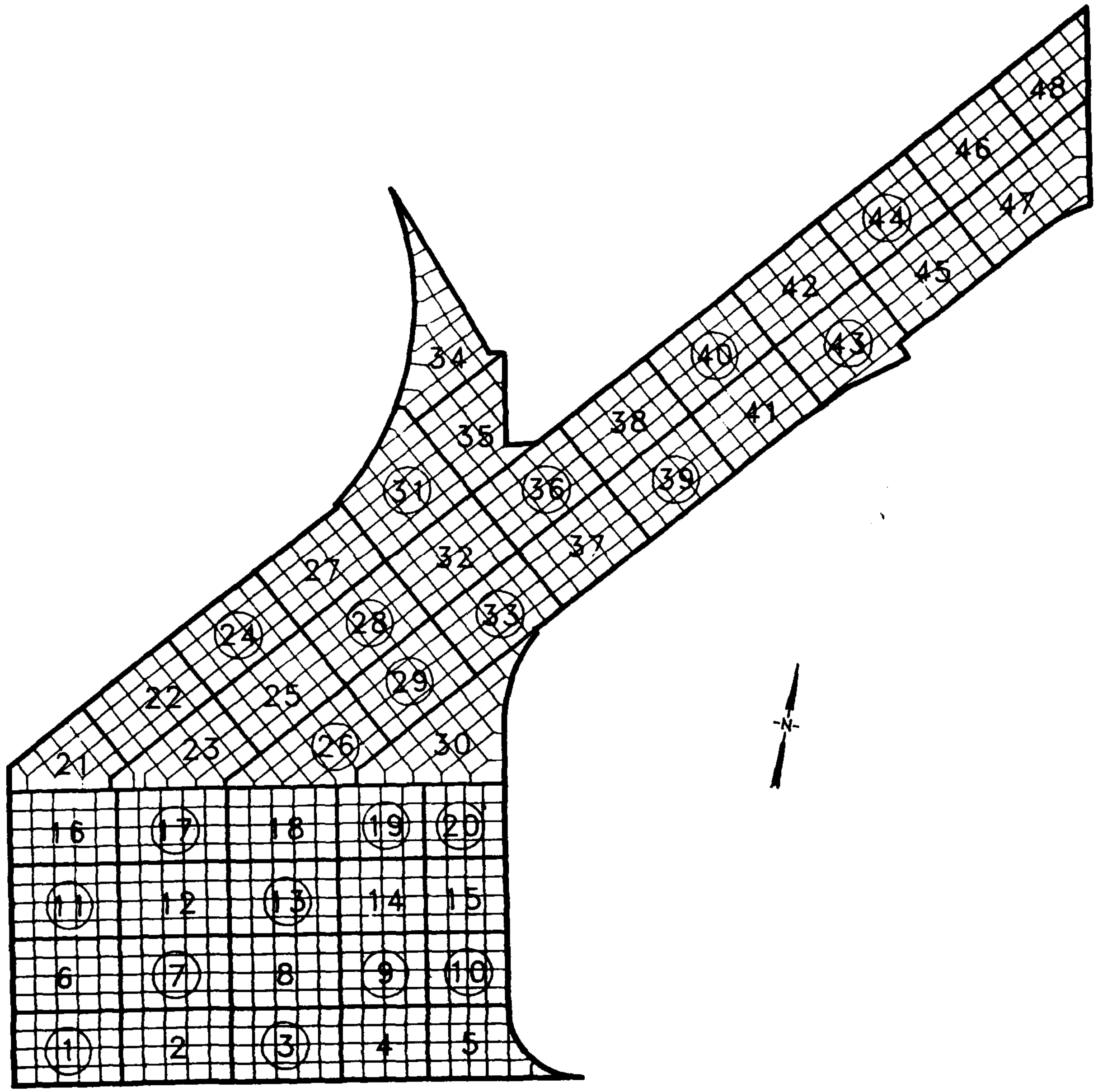


Figure 4. Sample unit layout, west end ladder taxiway (feature T4A)

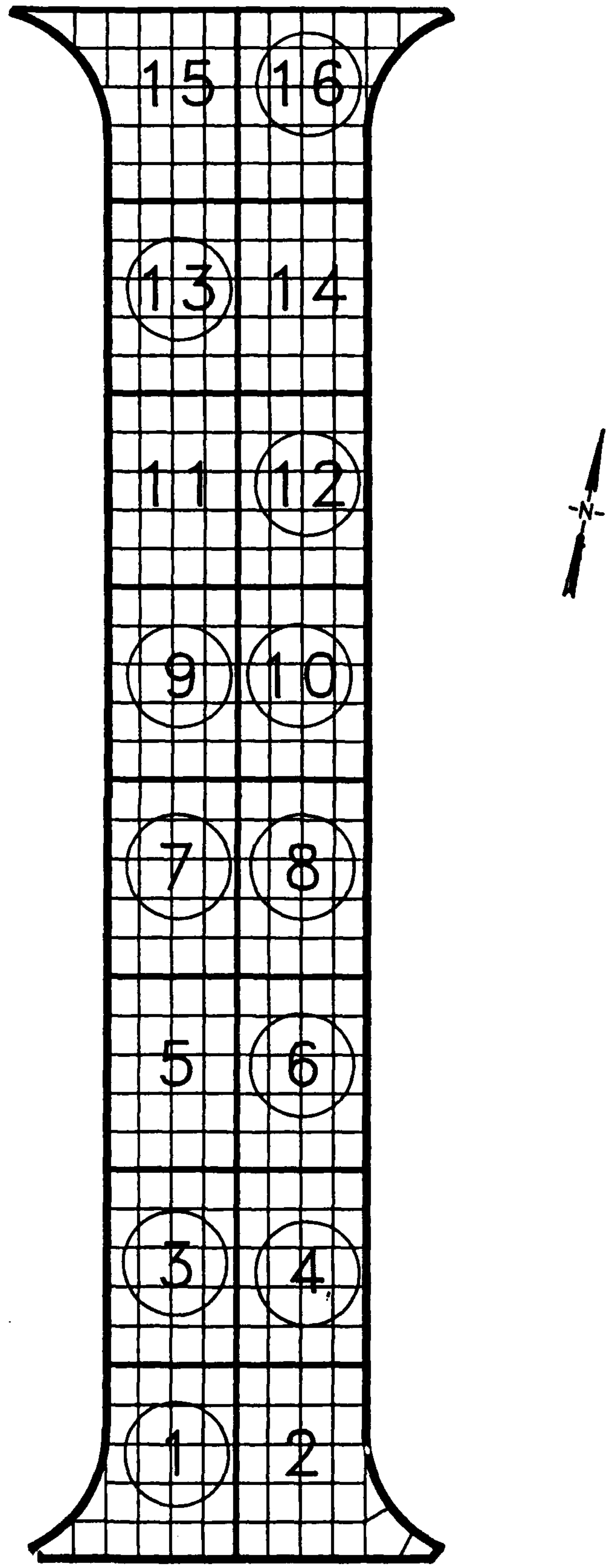


Figure 5. Sample unit layout, interior ladder taxiway (feature T5C)

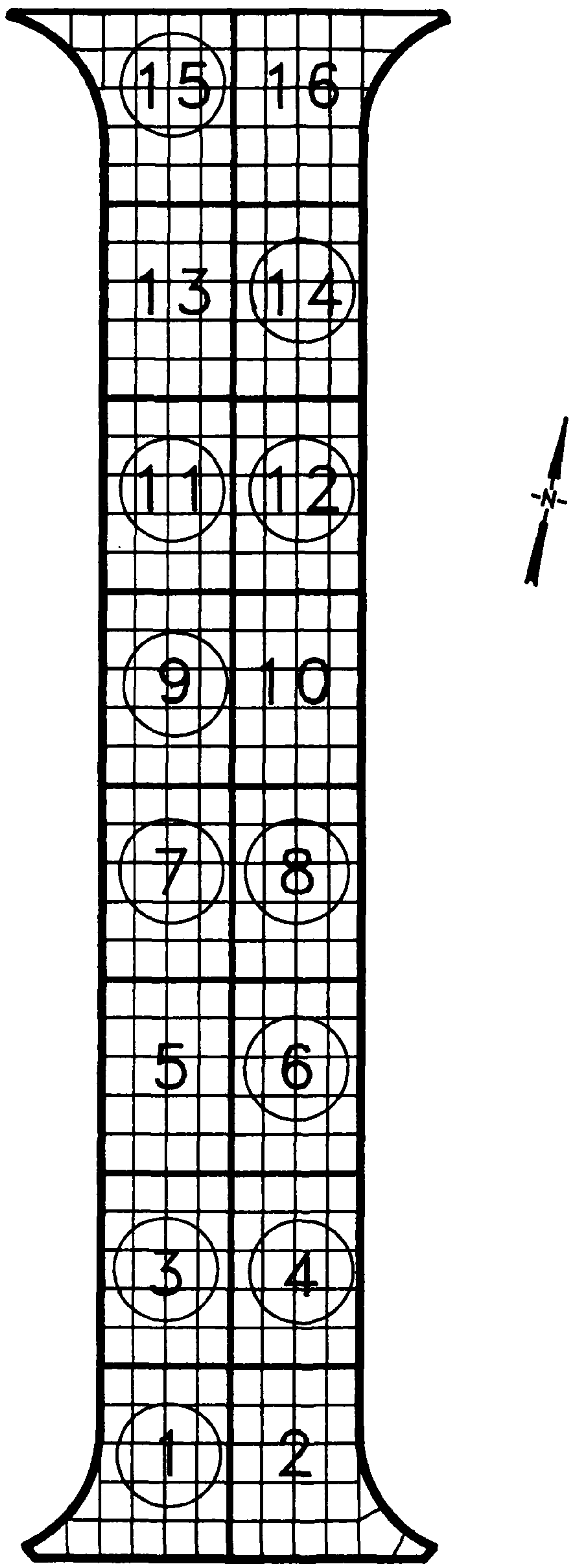


Figure 6. Sample unit layout, interior ladder taxiway (feature T6C)

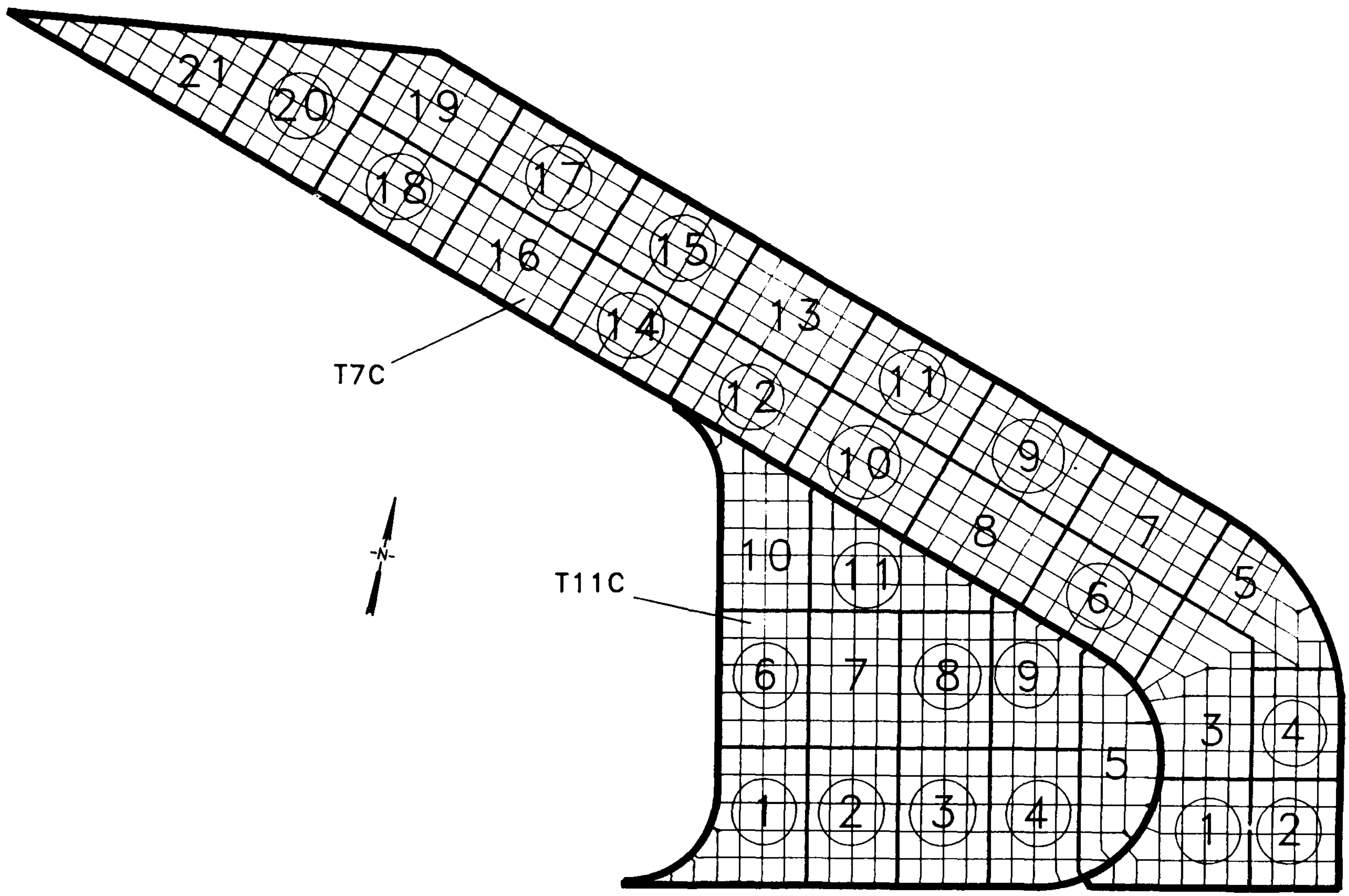


Figure 7. Sample unit layout, east end ladder taxiway (features T7C and T11C)

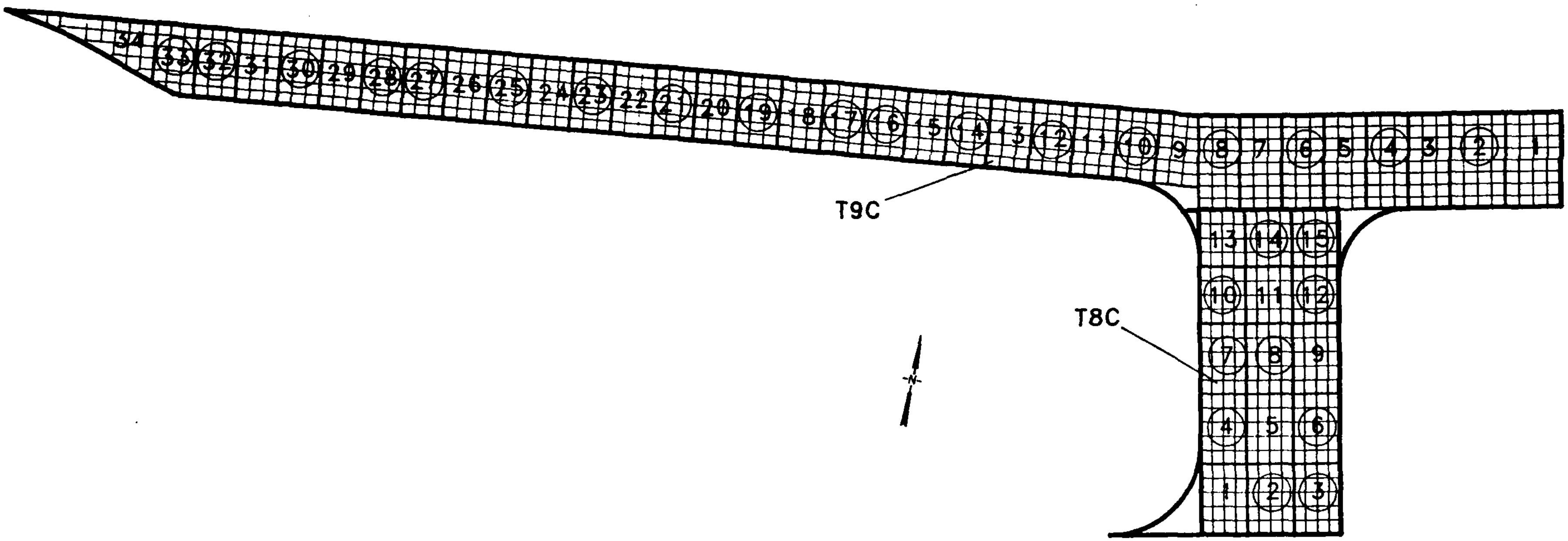


Figure 8. Sample unit layout, east end taxiway (features T8C and T9C)

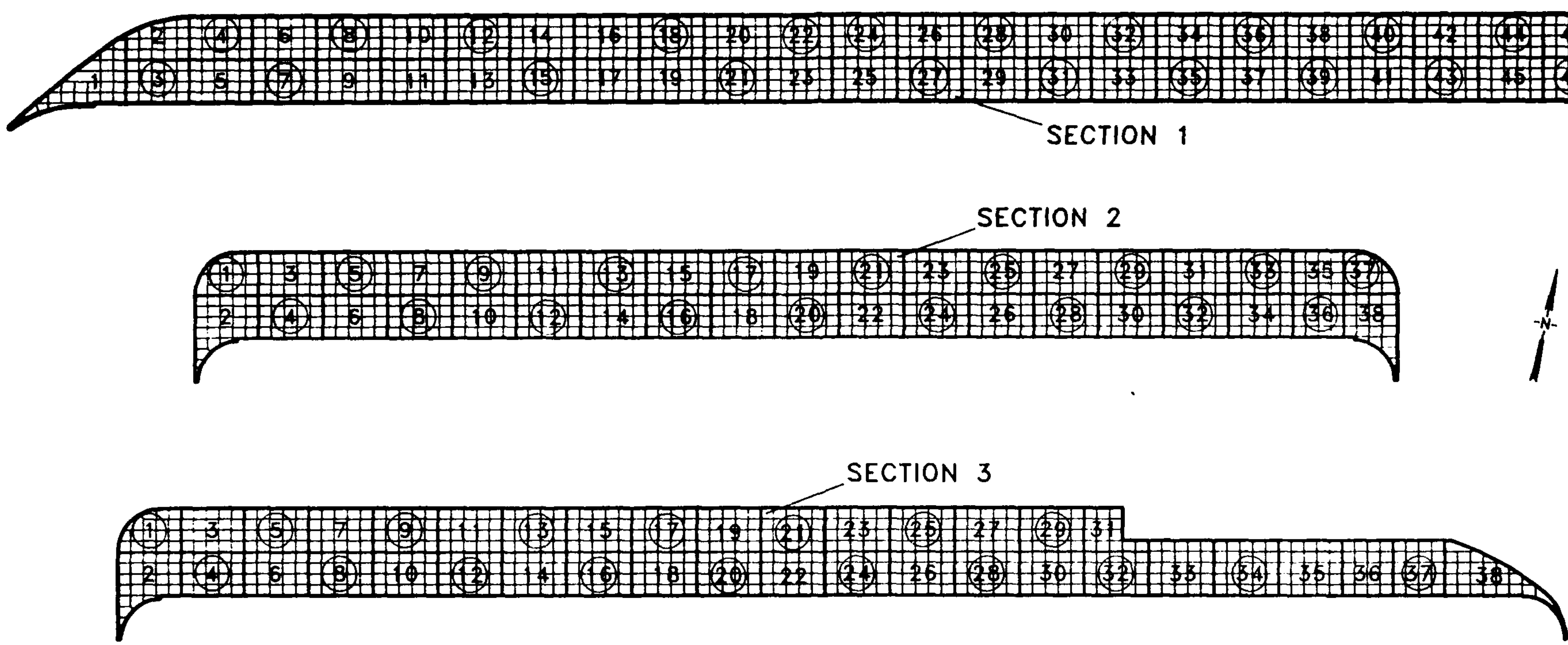


Figure 9. Sample unit layout, main apron taxiway (feature T10A)

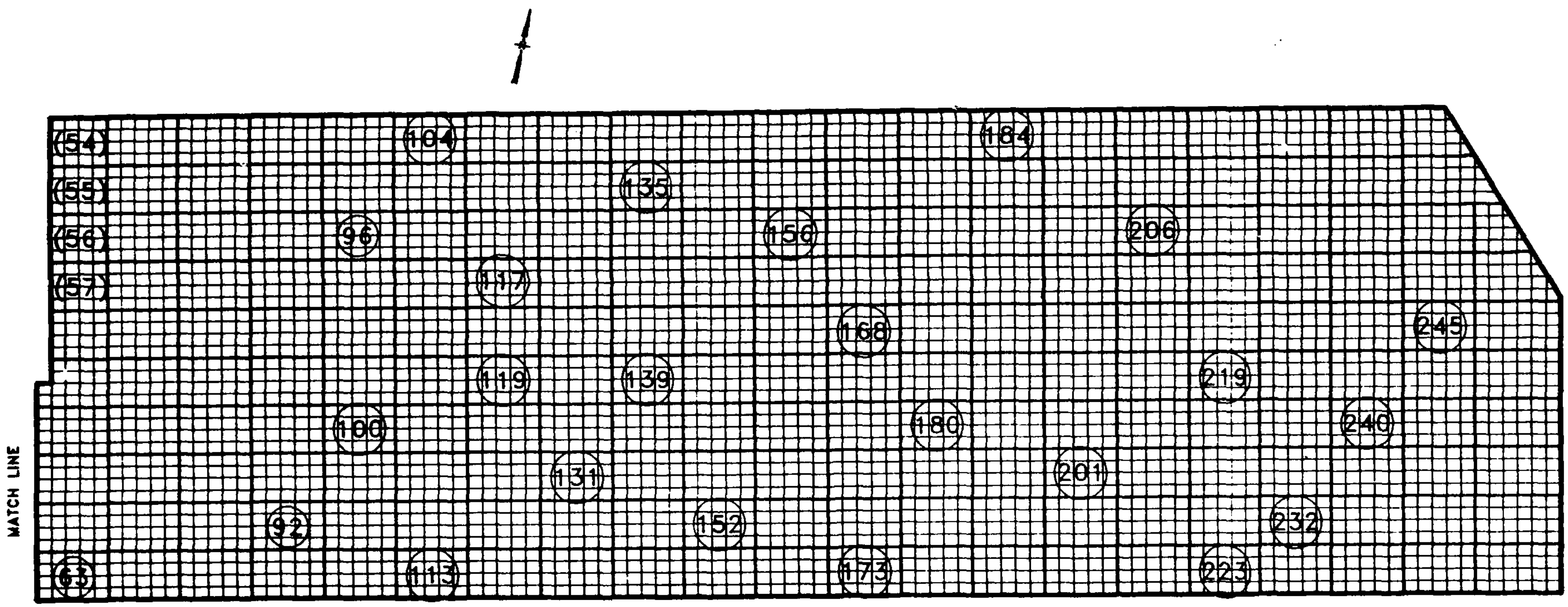


Figure 10. Sample unit layout, north apron extension (feature A1B)

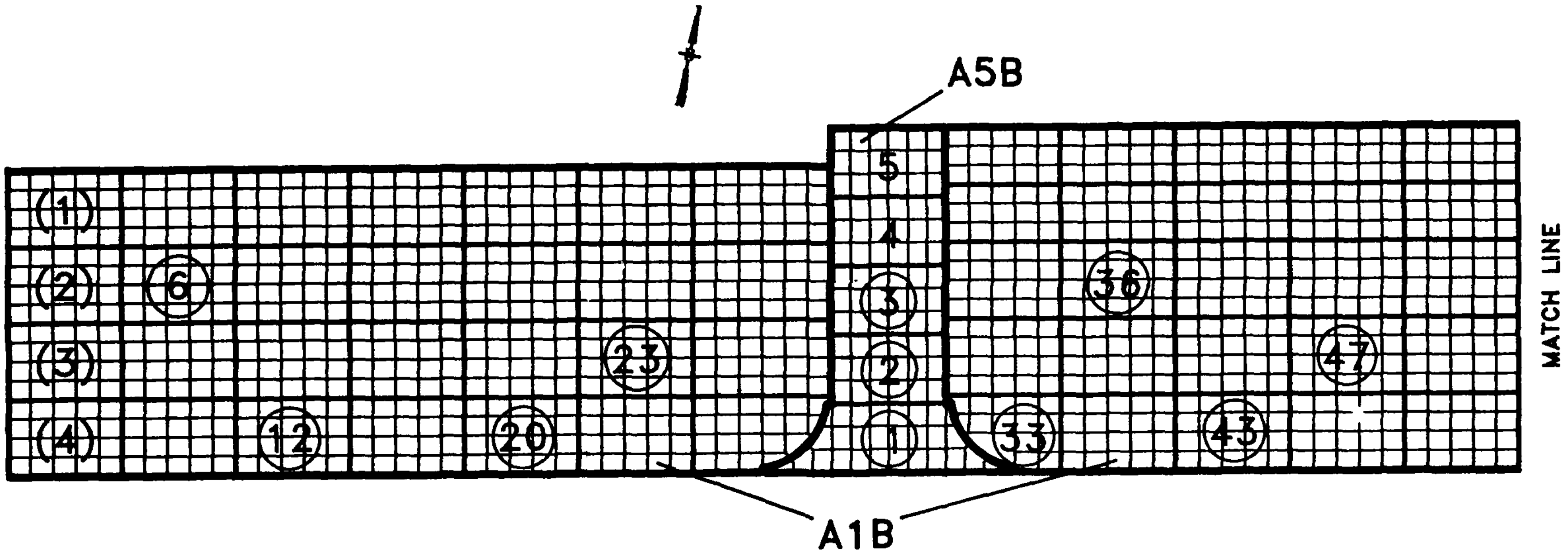


Figure 11. Sample unit layout, north apron extension (features A1B and A5B)

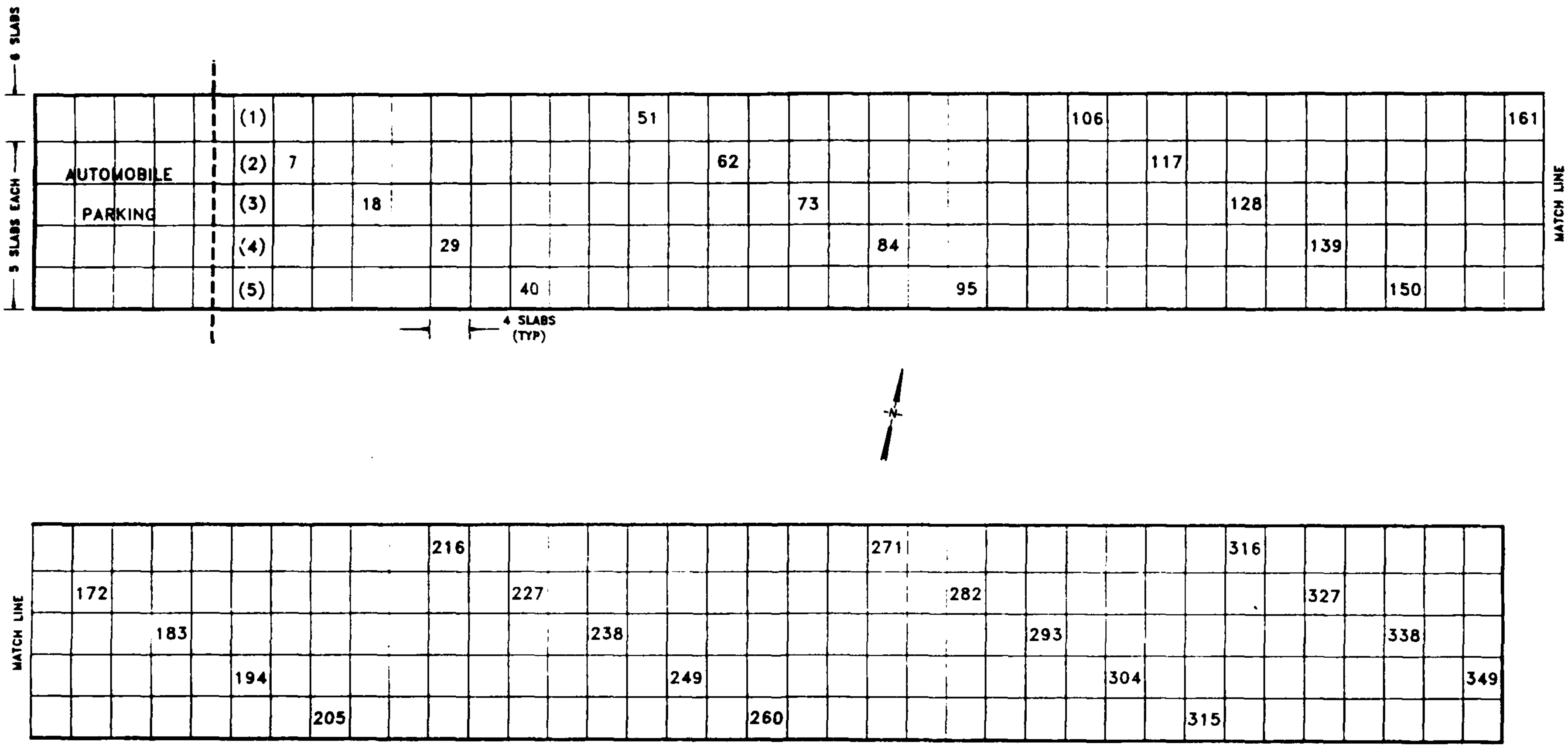


Figure 12. Sample unit layout, main apron (feature A2B)

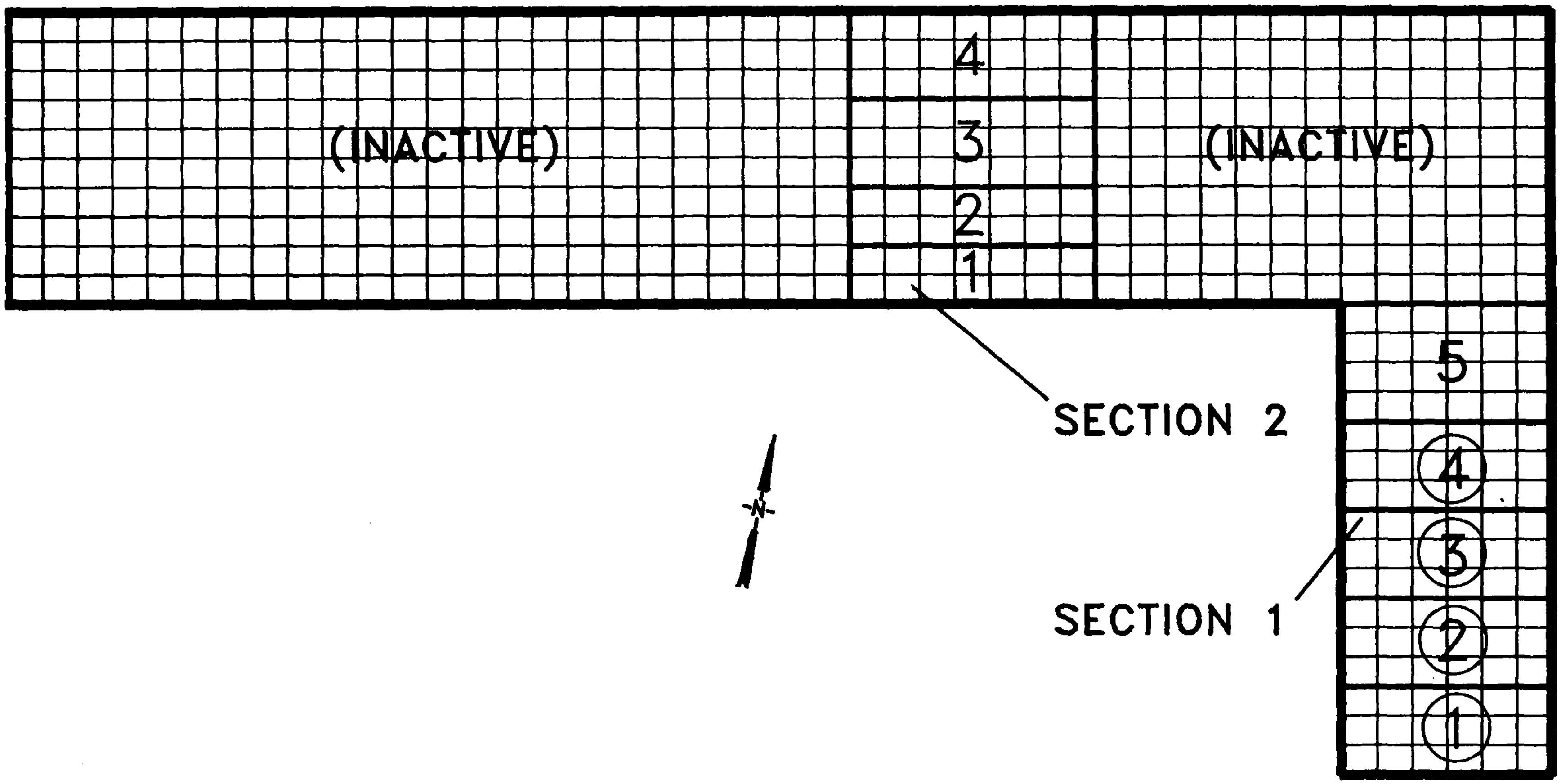


Figure 13. Sample unit layout, main apron extension (feature A3B)

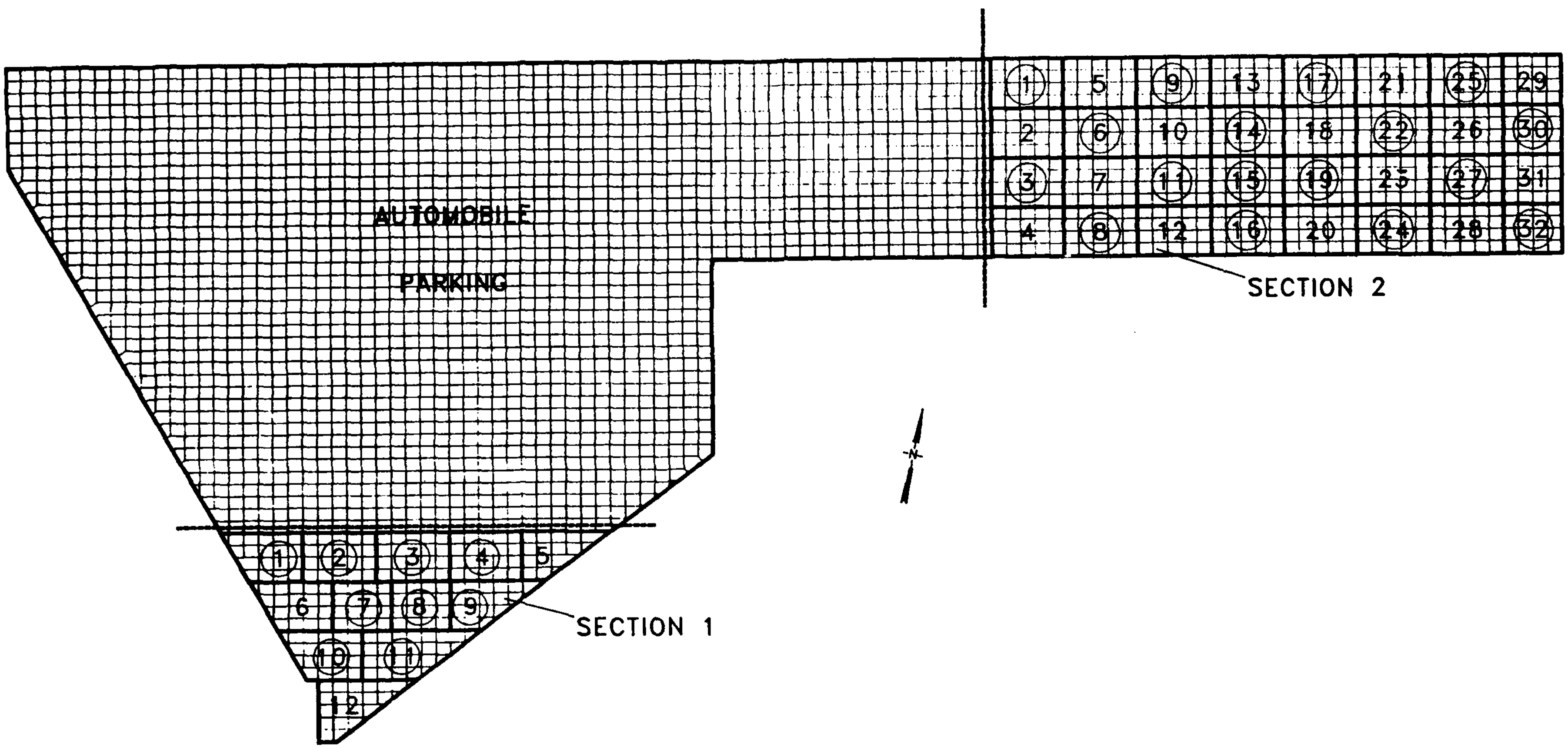


Figure 14. Sample unit layout, west apron extension (feature A4B)

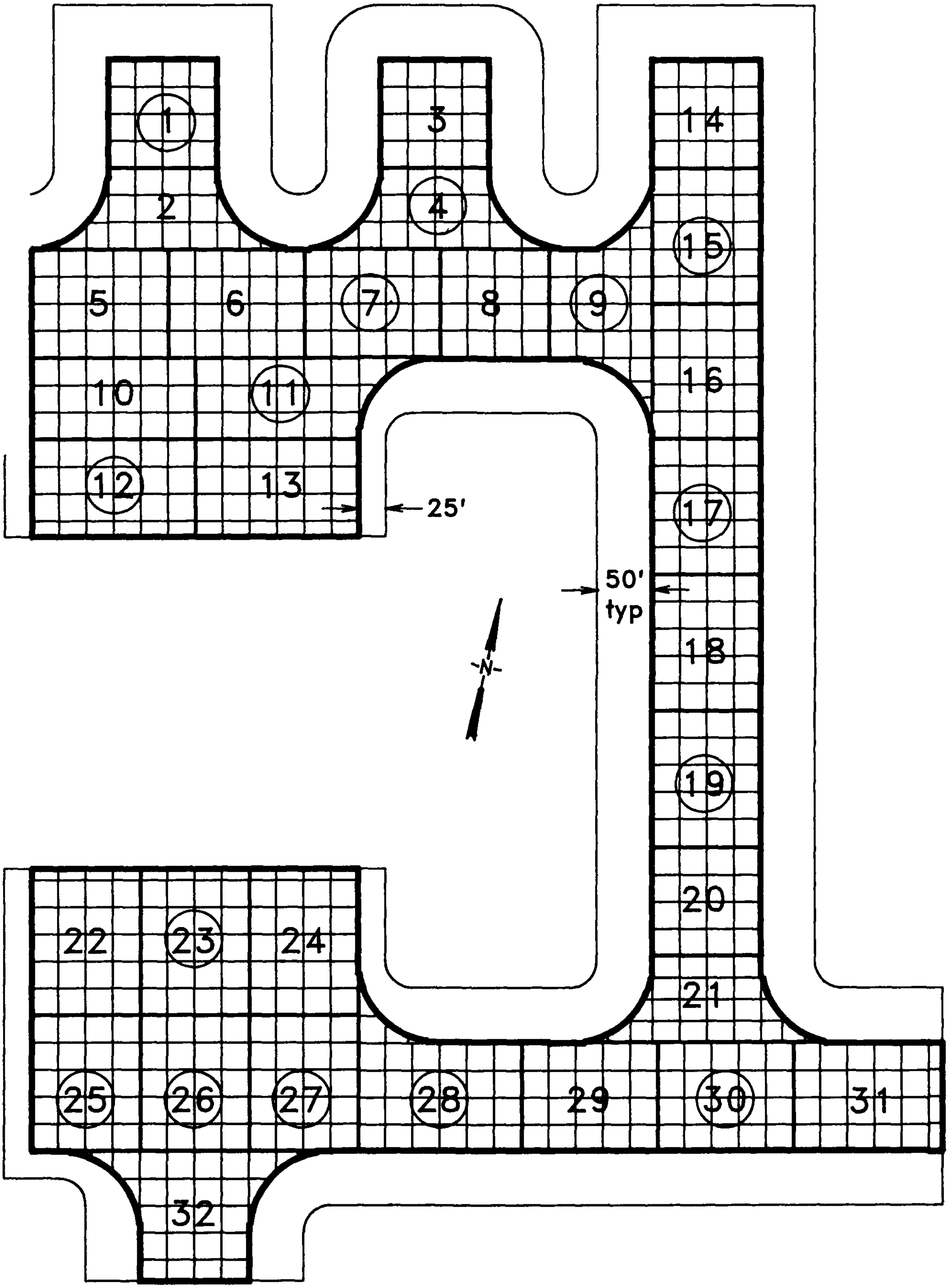


Figure 15. Sample unit layout, B-2 test facility (feature A6B)

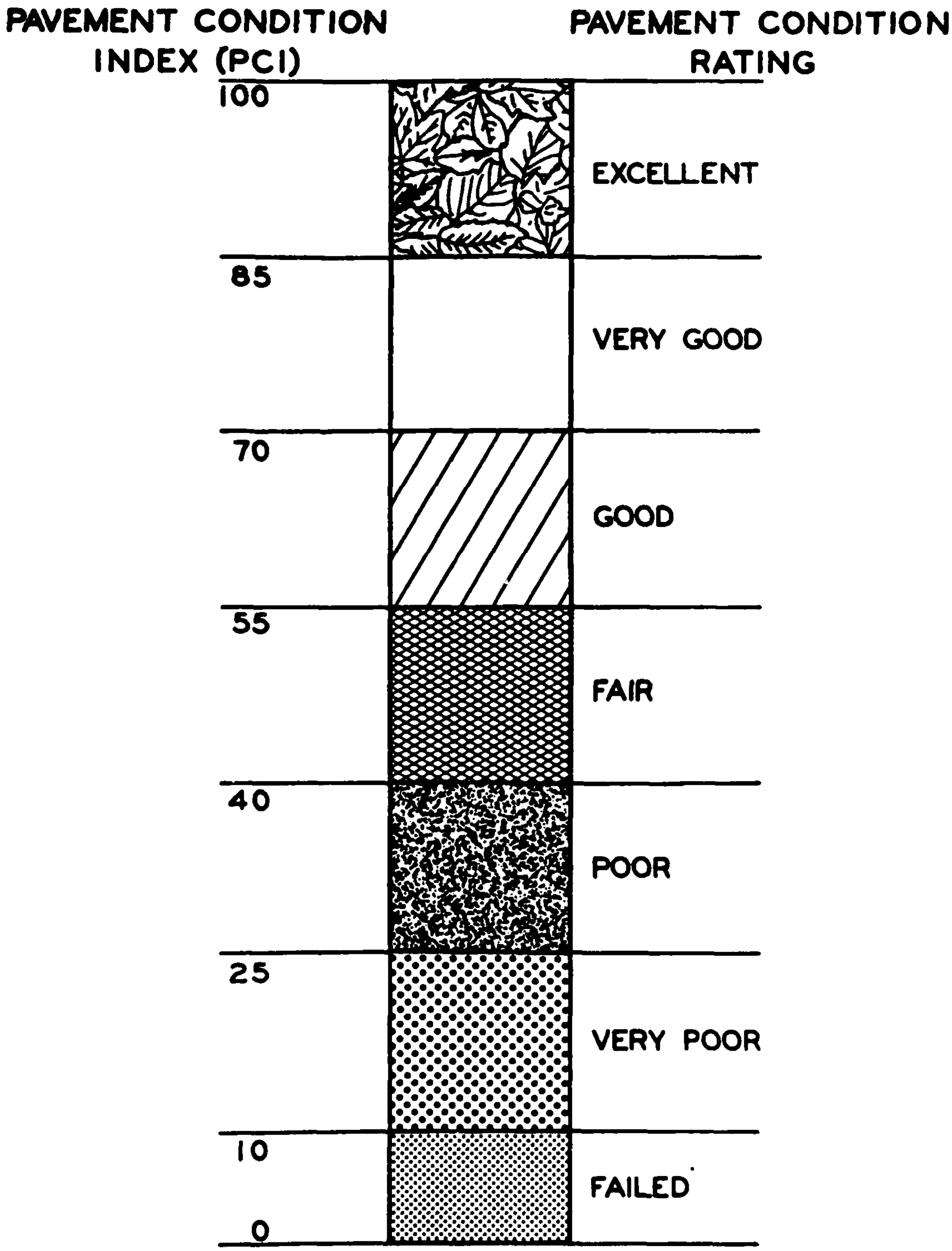


Figure 16. Scale for pavement condition ratings

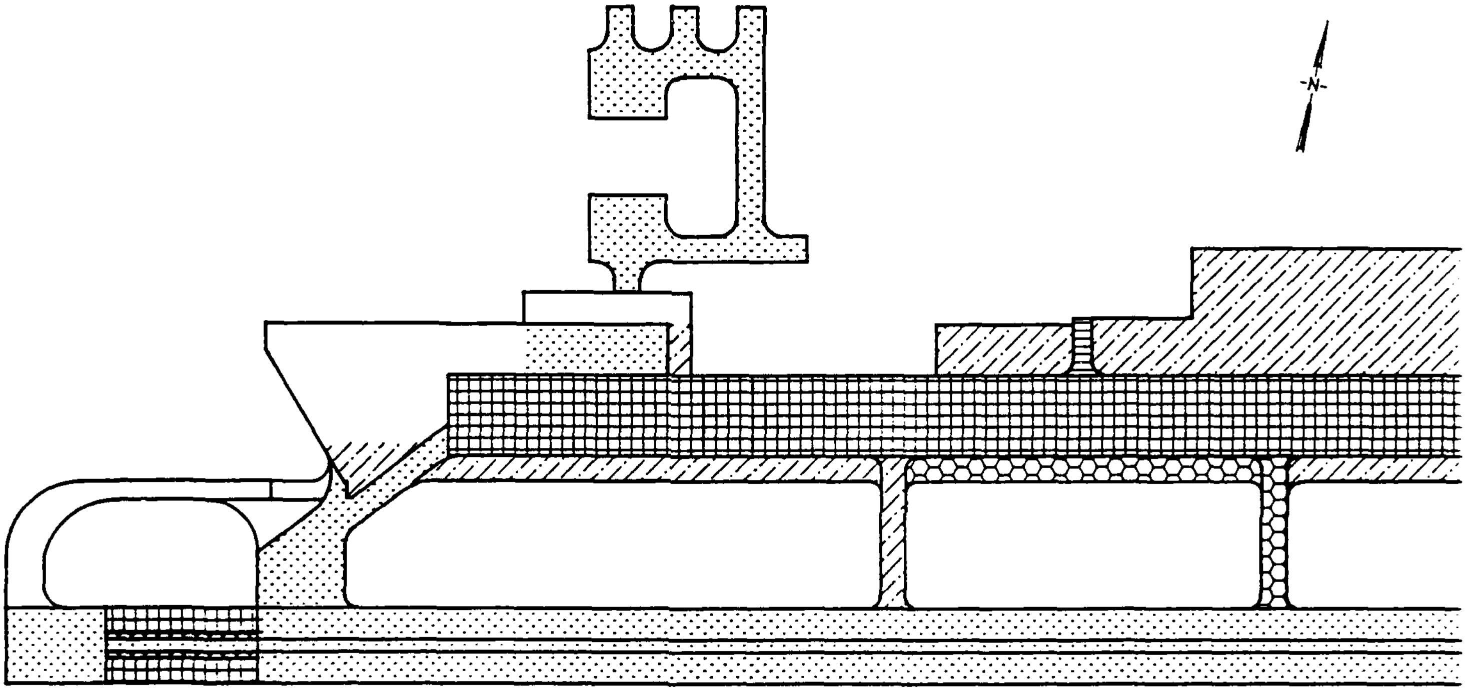
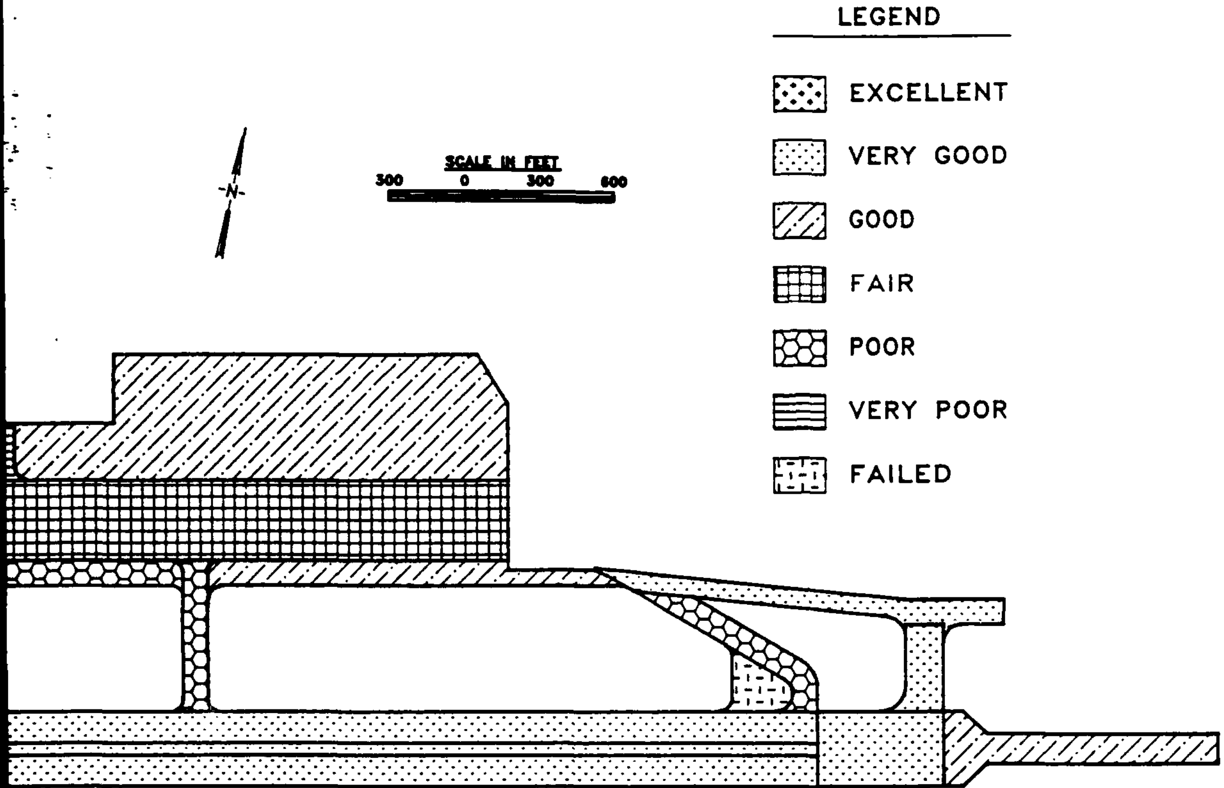


Figure 17. Pavement condition ratings of South B



condition ratings of South Base

Iof2

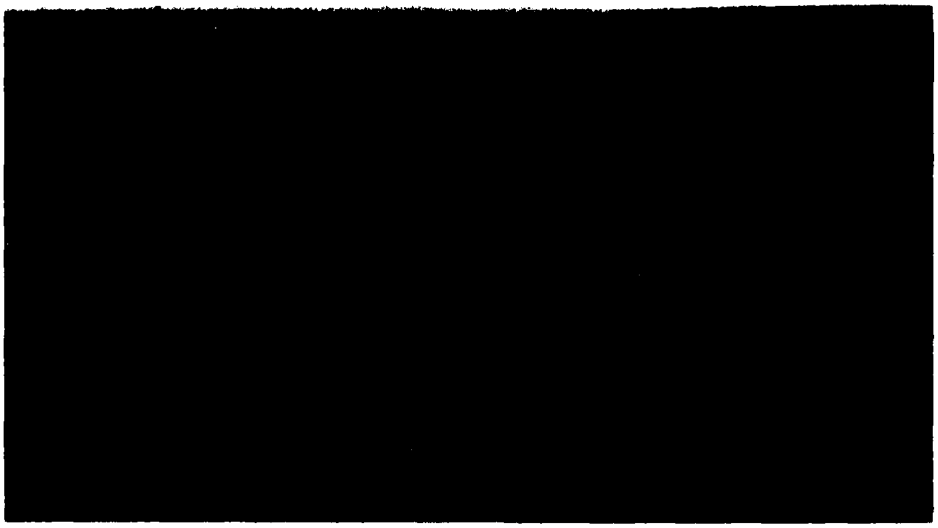


Photo 1. Low-severity weathering and medium-severity block cracking, Runway 6-24 (R3C)

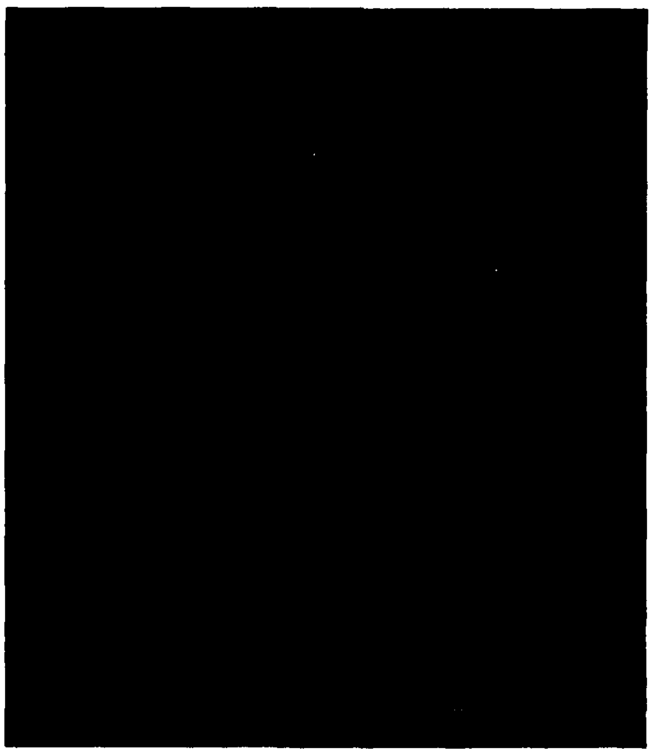


Photo 2. Medium-severity linear cracking, Runway 6-24 (R6C)

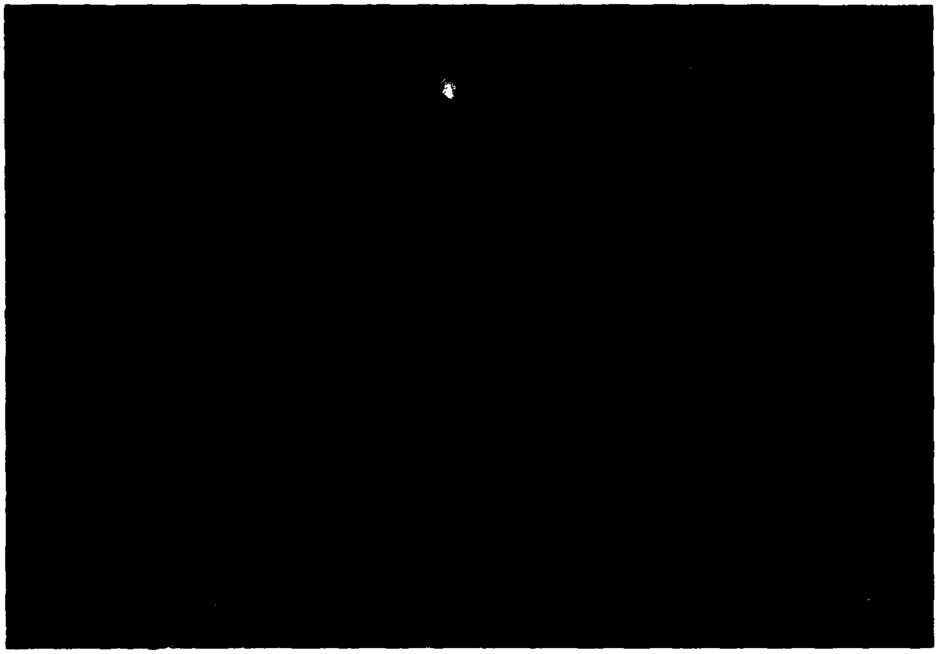


Photo 3 Low- and medium-severity corner breaks, Runway 6-24 (R6C)

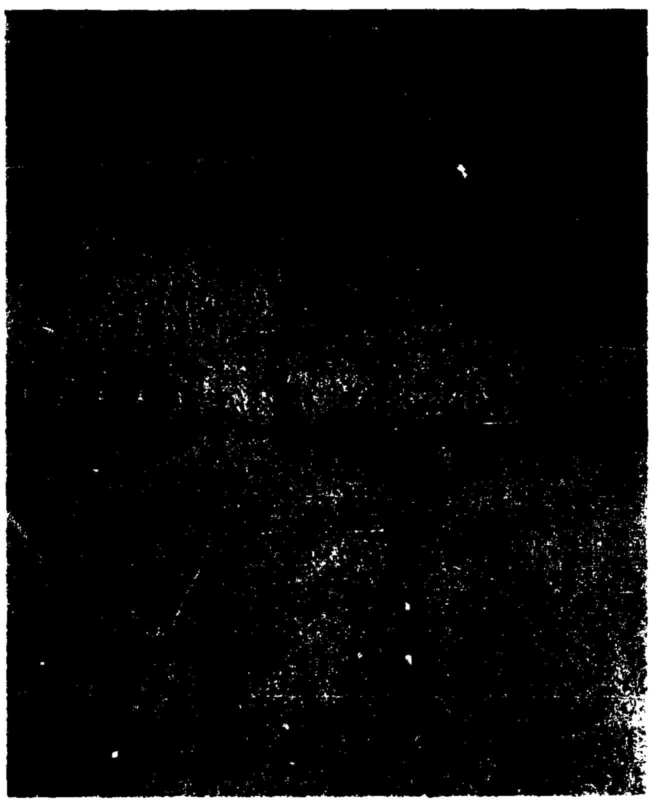


Photo 4. Typical misalignment of joints formed with fiber insert

Photo 5. Medium-severity joint spall at fiber joint, east end taxiway (T8C)

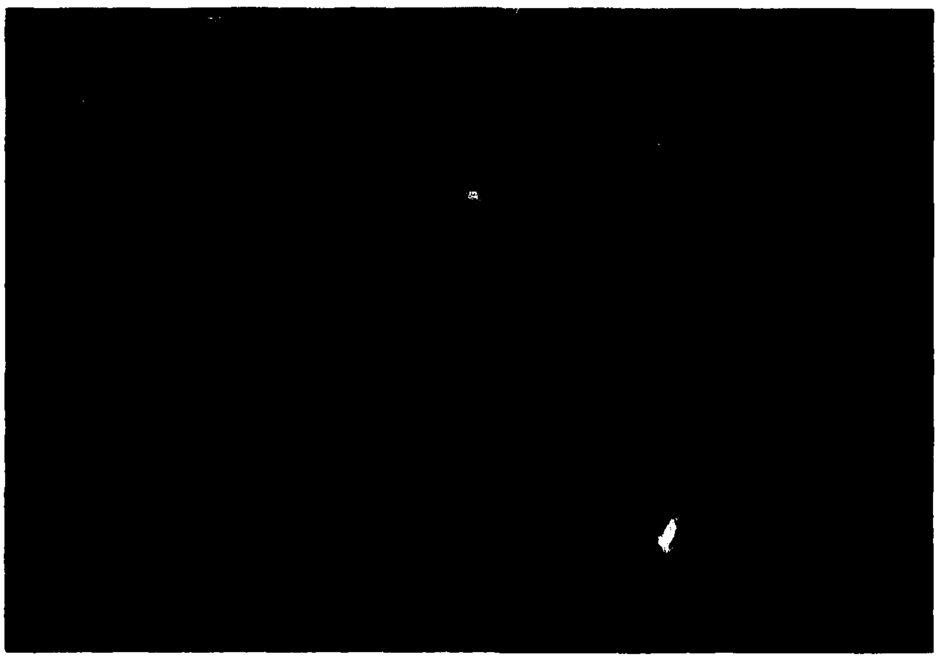


Photo 6. High-severity shattered slab, ladder taxiway (T6C)

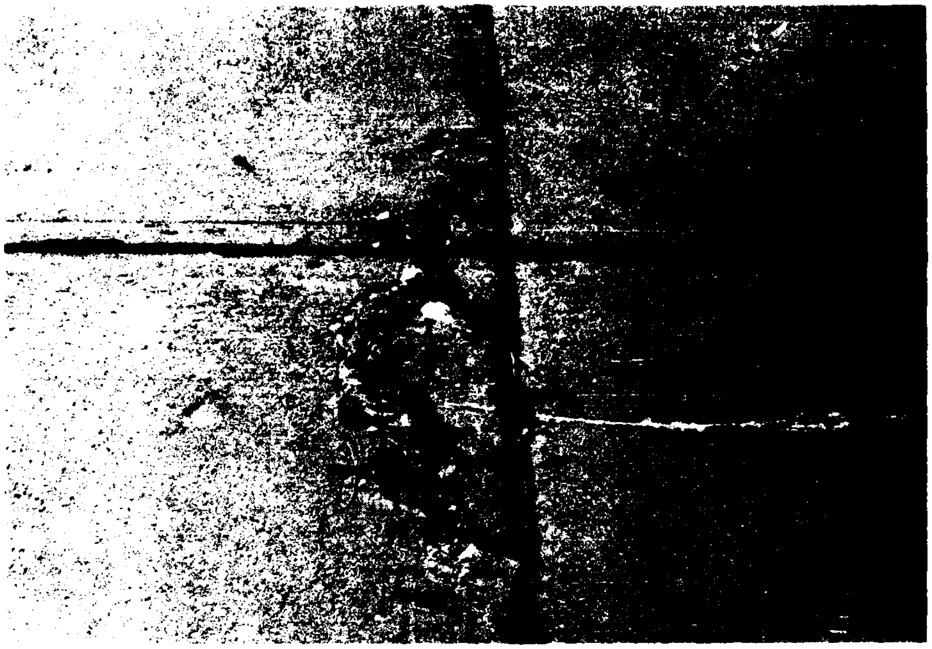


Photo 7. High-severity corner spall, main apron taxiway (T10A)

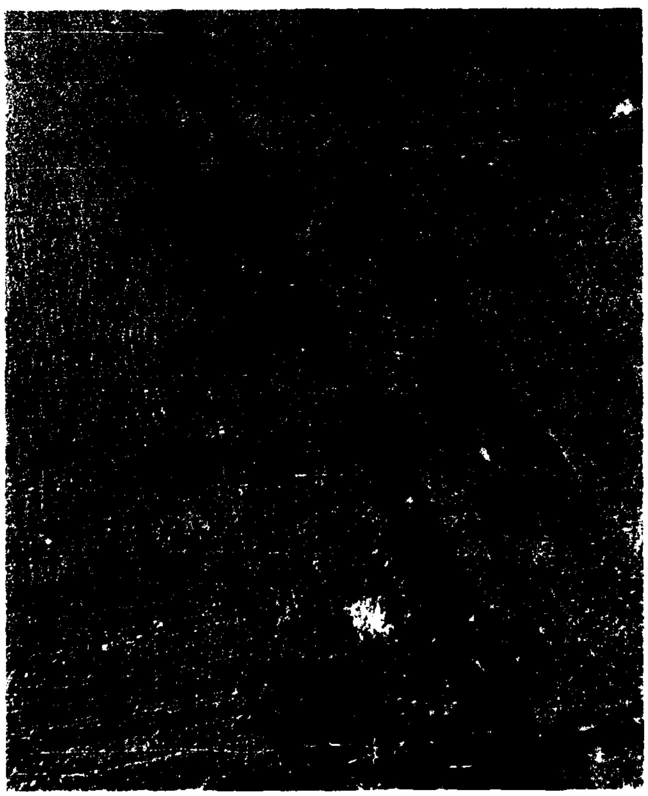


Photo 8. Typical high-severity joint seal damage and debris-filled joint

Photo 9. High-severity joint spall, east end ladder taxiway (T11C)

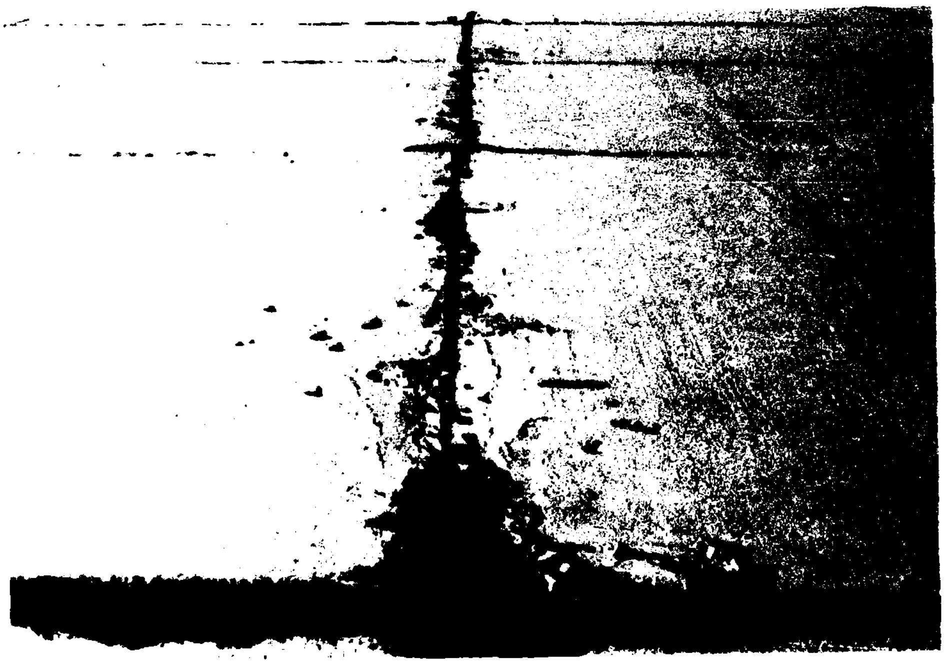


Photo 10. Low-severity blow-up, north apron extension (A1B)

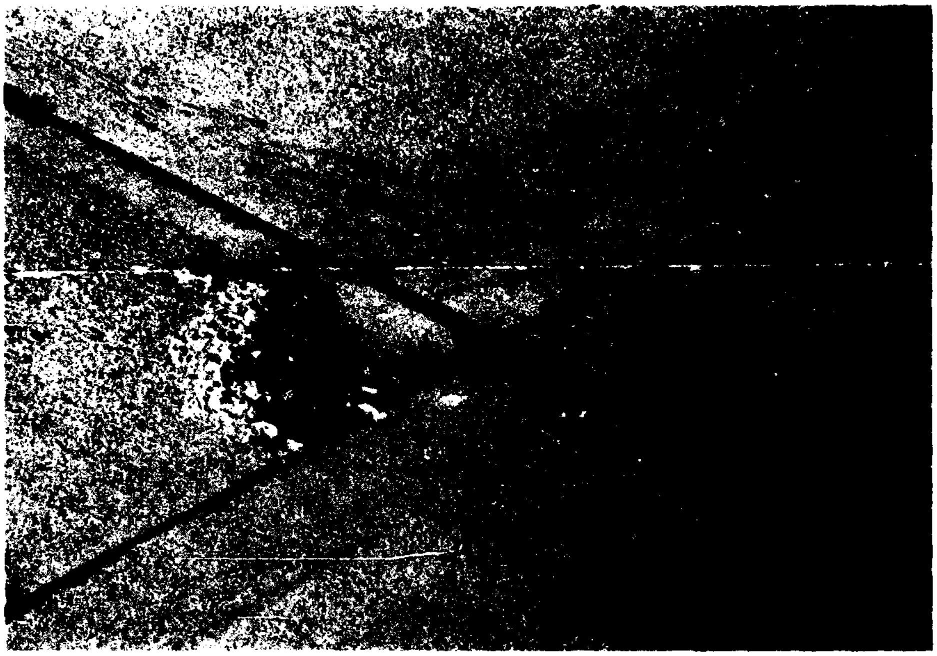


Photo 11. High-severity corner spall, north apron extension (A1B)

Photo 12. High-severity shattered slab, main apron (A2B)

Photo 13. Typical low-severity patch, main apron (A2B)

Photo 14. High-severity corner break with settlement, main apron (A2B)